VD300 Inverter

Thank you for purchasing VD300 Series Inverters!
VD300 is a high-performance vector control inverter developed by VicRuns. Adopting advanced vector control algorithm, it is widely used for asynchronous motor speed control. Through its integrated EMC design and with optimized PWM control technique to meet users' demand on environmental requirement such as low-noise in application places and low EMI. It has perfect anti-tripping control and good adaptive ability to bad power grid, temperature, humidity and dust, in order to satisfy various sophisticated requirement under high precision drive applications,

thus to satisfy users expectation of higher reliability and stronger adaptability to environment of their equipments, achieving industry specialization and personalized motor drive and control system solution.

VD300 series high performance vector control inverter has following outstanding features:

1. various control method
supporting control method: Non-PG vector control mode 0, Non-PG vector control mode 1, linear V/F control, parabola V/F control, multi-stage V/F control, V/F separation control.
2. advanced vector control algorithm
Optimized no-speed sensor vector control has better low speed stability, stronger low frequency load capacity, supporting speed control and torque control.
3. support multi-function I/O extension and multi-function MFI extension port
Multi-function I/O extension card, multi-function MFI extension port can connect related extension function unit defined by manufacturer.

This manual provides the related issues: user installing and site wiring, quick debug, parameters setting, failure diagnose and eliminate and daily maintenance and correlation matters. Please read this manual to make sure you can install, use and

maintain the inverter correctly, then play their superior performance.
Please send this manual to the user or maintainer of this inverter, and properly kept.

Unpacking and inspection：
Every inverter has been inspected rigorously before shipping.
Please confirm carefully when unpacking the packing carton：

- Check if any damage signs of the product and its package.
- Check if the model and inverter rated values on the nameplate are the same as stated on your order and user manual.
- The box contains the inverter, manufacturer certificate, user manual.

If the product is damaged during transportation, or there is any omission or damage, please contact our company or your local supplier immediately.

First time use suggests：
The users who use this product for the first time shall read this manual carefully. For any doubt on certain functions and performances, please contact the technical support personnel of our company for help,

so as to use this product properly. With commitment to the constant improvement of the inverter products, our company may change the information provided without additional notice.

VD300 series inverter is confirmed to below international standard, has passed the CE certification.
IEC/EN 61800-5-1:2003 adjustable speed electric drive system safety regulation requirements;
IEC/EN 61800-3:2004 adjustable speed electric drive system: part 3: product EMC standard and its specific test method;
IEC/EN61000-2-1、2-2、3-2、3-3、4-2、4-3、4-4、4-5、4-6；EMC international and EU standard .

Contents

Chapter 1 Safety and Precautions ……1
1.1 Identifying and Definition ……1
1.2 Safety Precautions ……3
1.3: Attentions ……3
Chapter 2 Product Information ……6
2.1 Designation Rules ……6
2.2 Nameplate……6
2.3 Inverter Series ……6
2.4 Technical Specifications ……7
2.5 Physical Appearance and Main structure diagram……9
2.6 Physical Appearance and Dimensions of Mounting……9
2.7 External Keypad Dimension……12
2.8 Brake Unit Model Selection Guide……13
2.9 Routine Repair and Maintenance of Inverter……15
3.0 Warranty Introduction……16
Chapter 3 Mechanical and Electrical Installation.……18
3.1 Installation Environment……18
3.2 The Installation Direction and Space……18
3.3 Disassemble and installation of Control Panel and Coverplate……19
3.4 Inverter and External Electrical Parts Connection……19
3.5 Standard Wiring Diagram……23
3.6 Main Circuit Terminal……26
3.7 Control Circuit Terminal……28
Chapter 4 Operation and Display……36
4.1 Introduction of Operation and Display Interface……36
4.2 Parameter Self-learning of Motor……38
4.3 User Password Setting……38
4.4 Lock on Parameters……38
Chapter 5 Function Parameter Table.……39
Chapter 6 Function Parameter Detail Introduction……78
6.1 P00 Basic Function Parameter Group……78
6.2 P01 Start/Stop Control Parameter Group……82
6.3 P02 Motor 1 Parameter Group……86
6.4 P03 Motor 1 Vector Control Parameter Group……87
6.5 P04 Motor 1 V/F control Parameter Group……91
6.6 P05 Input Terminal function parameter group……93
6.7 P06 Output Terminal Function Parameter Group……103
6.8 P08 Process PID control parameter group……108
6.9 P09 Special Function parameter group……114
6.10 P10 Keypad function and display parameter group……121
6.11 P11 Multi-stage speed and simple PLC function parameter group……125
6.12 P13 Protection function parameter group……128
6.13 P14 Error record parameter group……134
6.14 P15 Modbus communication parameter group……135
6.15 P20 Motor 2 parameter group.4 Definition of Communication Data Address……137
6.16 P21 Motor 2 V/F control parameter group……137
6.17 P28 Status monitoring parameter group……137
6.18 P29 User parameter group……139
6.19 P30 Manufacturer parameter group……140
Chapter 7 EMC………141
7.1 Definition……141
7.2 EMC standard introduction……141
7.3 EMC Precautions……141
Chapter 8 Failure Diagnose and Solution…………144
8.1 Failure alarm and Countermeasures……144

8.2 Common Faults and Solutions……147
Chapter 9 Communication Protocol………149
9.1 Communication protocol content……149
9.2 Application method……149
9.3 Bus structure……149
9.4 Protocl Introduction……149
9.5 Communication data structure……149
9.6 Command code and communication data description……150
Appendix A multi-function I/O extension card……158

Chapter 1 Safety and Precautions

1.1 Safety definition

During the installation, commissioning and maintenance of the system, please make sure to follow the safety and precautions of this chapter. In case of a result of illegal operations, caused any harm and losses is nothing to do with the manufacturer.

In this manual, safety precautions are divided into two types below:

⚠ Danger
●Danger arising due to improper operations may cause severe hurt or even death and major property damage.

⚠ Warning
● Danger arising due to improper operations may cause moderate damage or light hurt, and equipment damage or property damage.

1.2 Safety precautions

1.2.1 Before installation：

⚠ DANGER
●Do not install the equipment if you find water seepage, component missing or damage upon unpacking. ●Do not install the equipment if the packing list does not conform to the product you received

⚠ DANGER
● Handle the equipment with care during transportation to prevent damage. ● Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury. ● Do not touch the components with your hands. Failure to comply will result in static electricity damage.

1.2.2 During Installation

⚠ DANGER
● Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire. ● Install the equipment according to regulations and tighten the fastening bolts. Failure to comply may result in equipment falling. ● Do not loosen the fixed screws of the components, especially the screws with red mark.

⚠ WARNING
● Do not drop conductive objects as wire ends or screw into inverter. Failure to comply will result in damages. ● Install inverter in place avoid to vibration, water drops and direct sunlight. ● When two inverters are installed in the same cabinet, arrange the installation positions properly to ensure normal cooling effect, keep the cabinet with good ventilation.

1.2.3 At wiring

⚠ DANGER
● Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. ● A circuit breaker must be used to isolate the power supply and inverter. Failure to comply may result in a fire. ● Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. ● Connect inverter to ground properly by standard. Failure to comply may result in electric shock. ● Do not connect the input power with output terminals U, V, W, confirm the mark on terminal before connection to avoid wrong wiring. Failure to comply can damage the inverter! ● Never connect the braking resistor between the DC bus terminals P+ and P-. Failure to comply may result in a fire. ● The wire size of main circuit should conformed to standard, the wiring should comply with EMC and local safety standard. Failure to comply may result in accidents. ● Use shielded cable for input output control circuit of analog and rapid speed pulse signal, and ensure the shielding layer is reliably grounded.

1.2.4 Before Power-on：

⚠ DANGER
● Check that the following requirements are met: – The voltage class of the power supply is consistent with the rated voltage class of the AC drive. – The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. – No short-circuit exists in the peripheral circuit. – The wiring is secured. - the external units of inverter and wires are configured under the manual instructed, all matched circuit and wiring are correctly connected. Failure to comply will result in damage to inverter!

1.2.5 During the operation:

⚠ DANGER
● Cover the inverter properly before power-on to prevent electric shock. ● Donot touch or operate the inverter with wet hands. Failure to comply will result in electric shock. ● Donot touch any terminal of inverter after power-on, or drag connection cable. Failure to comply will result in equipment damage or electric shock. ● Donot try to check or change the manufacturer parameter. Failure to comply may result in malfunction or damage to inverter! ● Make sure the mechanical equipment is ready to start before inverter running with loading, make sure related staff is in safety zone. Failure to comply will result in damage or personal hurt! ● Please pay attention to hiding accident which may result in personal hurt or property damage while motor is running, if it is necessary to identify the motor parameter.

1.2.6 During operation:

⚠ DANGER
● Do not touch the cooling fan or brake resistor. Failure to comply will result in personal hurt! ● Donot do inspection while inverter running, except for professional technician. Failure to comply will result in personal hurt!

⚠ WARNING
● Donot move inverter or the installed cabinet while it is running, keep external objects falling into the device. Failure to comply will result in damage. ● Start/Stop inverter via terminal function or other control method, try not to start inverter via directly power-on control method. Do not use contactor on inverter output terminal to control motor starting or stop.

1.2.7 During maintenance:

⚠ DANGER
● Do not repair and maintain the equipment if power is connected. Otherwise there will be danger of electric shock! ● If the LED is still on light on control panel, it is prohibited to disassemble the body in order to avoid electric shock. ●The inverter shall be repaired and maintained only by the qualified person who has received professional training. Otherwise, it may cause personal injury or equipment damage ● For all the standard equipped or optional accessories, must be dismounted or mounted while the inverter power is disconnected.

1.3 General Precautions

1.3.1 Motor Insulation Inspection

For first time usage, motor is left unused for long time or periodically inspected, insulation inspection must be done to avoid motor coils insulation failure which may result in inverter damage. Disconnect motor and inverter before inspection, 500V voltage type megohmmeter is recommended. It is up to standard if insulation resist value no less than 5MΩ.

1.3.2 Motor overheat protection

If selected motor and inverter rated capacity doesn't match, especially the inverter rated power larger than motor rated power, it is necessary to adjust the motor protect parameter of inverter into actual used motor parameter. Or a thermal relay can be installed to motor to protect motor.

1.3.3 Running with power frequency (under or above)

This inverter can provide 0.00Hz~650.00Hz output frequency, so motor is running at low frequency on long time. Take care of motor cooling or frequency converted motor could be a choice. When motor running with over-limit rate frequency, consider the bearing capacity of mechanic system with high speed, to avoid the shortening of lifespan of equipment.

1.3.4 Vibration and resonance of mechanic system

Since inherent property of mechanic system, inverter could have mechanic system resonance point while accelerating or decelerating, by setting inverter jump frequency can avoid mechanic system resonance point. If customer required running frequency is happened to be the same with mechanic resonance frequency, it is necessary to change running frequency or change the inherent resonance frequency of mechanic system.

1.3.5 regarding motor heating and noise

Inverter output voltage is PWM wave, with some higher harmonic, so motor temperature rising, noise and vibration should increase a little comparing with power frequency, which is normal.

1.3.6 Pressure sensing device on output side or improve power factor capacitor

Inverter output voltage is PWM wave, if output side installed capacitor to improve power factor or pressure sensing device to anti-thunder, it could easily result in instant over current or damage to inverter. Disassemble such devices before inverter installation.

1.3.7 Switch device as contactor installed on inverter input output side

If there is a contactor between power supply and inverter input terminal, it is prohibit to use it to start/stop inverter. When it is very necessary to use the contactor to start/stop inverter, the action interval time should not less than 1hr. Since frequent charge/discharge could easily shorten the lifespan of electrolytic capacitor inside inverter. If there is a contactor between motor and inverter output terminal, make sure if motor is static and inverter is without output, then switch the contactor, failure to comply may damage the inverter.

1.3.8 Applications with non-rated voltage

The application voltage range used on inverter should not exceed the regulated voltage on this manual, low voltage or higher voltage can easily damage inverter.

If power is not permitted, then use voltage reduction or voltage rising device to deal with voltage conversion in order to comply with inverter input voltage requirement.

1.3.9 3phase input change to 2phase input

If inverter is 3phase input type, donot use 2phase power supply, otherwise it could result in phase loss protection error even inverter damage.

1.3.10 Lightening surge protection

Although there is lightening overvoltage overcurrent device inside inverter, which has certain self-protection function for lightening induction. But for user located in lightening frequent zones, it is necessary to add lightening protection unit in front of inverter, this does good to extend inverter lifespan.

1.3.11 Altitude level and voltage reduction usage

Place with altitude exceeding 2000M, inverter cooling effect get worse due to air condense reduced, so under-rated usage of inverter is necessary.

1.3.12 Common DC bus Introduction

In condition of several units of inverter running at the same time, then common DC bus can be adopted to save electricity. This type of inverter support common DC bus, but make sure the power specification of those inverters are very close in advance, otherwise it could damage inverter.

1.3.13 Precaution of Inverter abandonment

Inverter belongs to electric electronic device, burning disposal will result lots of harmful gas even exploding. Please refer to related national laws and regulations to dispose or abandon.

1.3.14 Regarding matching motor

① this type inverter standard matching motor is quadrupole squirrel-cage asynchronous induction motor or permanent magnet synchronous motor. When the dragging motor is not above type, please refer to motor rated current to select the suitable inverter.

② the cooling fan of general motor and rotor spindle are coaxial connected. While motor rotating speed reducing resulted cooling fan speed down proportionally and so making heat dissipation worse. As a conclusion, if motor running at low frequency stage for long time, it is necessary to add a strong exhaust fan or change the motor to variable frequency motor.

③ Inverter default setup has built-in standard parameter for its adaptive motor, but in actual application, it is necessary to identify motor parameter or change its original default setup of motor parameter. Otherwise it affect operation efficiency and protection performance to motor.

④ Due to cable or motor internal short circuit can result in inverter alarm or even exploding. So insulation and short circuit test on wiring and motor should be done before connecting and installing motor. If the system has been idled for long time, then a retest should be done to avoid system damage or performance reduce.

Chapter 2 Product Information

2.1 Designation Rules

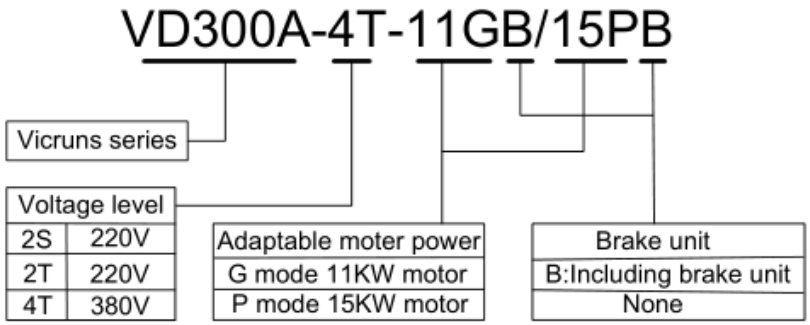


Fig2.1-1 Designation Rules

2.2 Nameplate

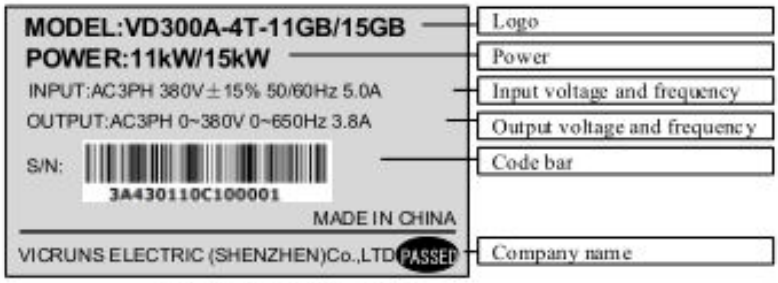


Fig2 .2-2 Nameplate

> ⚠ WARNING
>
> ●The bar code on inverter nameplate is the only code to recognize its identity, so the bar code is the most important basis for the after sales service.

2.3 Inverter Series

Model No.	Power capacity (kVA)	Input current (A)	Output current (A)	Adaptable Motor	
				kW	HP
Single-phase Power supply：220V，50/60Hz					
VD300-2S-0.7GB	1.5	8.2	4.0	0.75	1
VD300-2S-1.5GB	3.0	14.0	7.0	1.5	2
VD300-2S-2.2GB	4.0	23.0	9.6	2.2	3
VD300-2S-3.7GB	5.9	35.0	17.0	3.7	5
VD300-2S-5.5GB	8.9	50.0	25.0	5.5	7.5
Three-phase Power supply：380V，50/60Hz					
VD300-4T-0.7GB	1.5	3.4	2.5	0.75	1
VD300-4T-1.5GB	3.0	5.0	3.8	1.5	2
VD300-4T-2.2GB	4.0	5.8	5.1	2.2	3
VD300-4T-3.7GB	5.9	10.5	9.0	3.7	5
VD300-4T-5.5GB VD300-4T-5.5PB	8.9	14.6	13.0	5.5	7.5
VD300-4T-7.5GB VD300-4T-7.5PB	11.0	20.5	17.0	7.5	10

VD300-4T-11GB	VD300-4T-11PB	17.0	26.0	25.0	11.0	15
VD300-4T-15GB	VD300-4T-15PB	21.0	35.0	32.0	15.0	20
VD300-4T-18.5G	VD300-4T-18.5PB	24.0	38.5	37.0	18.5	25
VD300-4T-22G	VD300-4T-22P	30.0	46.5	45.0	22	30
VD300-4T-30G	VD300-4T-30P	40.0	62.0	60.0	30	40
VD300-4T-37G	VD300-4T-37P	50.0	76.0	75.0	37	50
VD300-4T-45G	VD300-4T-45P	60.0	92.0	91.0	45	60
VD300-4T-55G	VD300-4T-55P	72.0	113.0	112.0	55	70
VD300-4T-75G	VD300-4T-75P	100.0	157.0	150.0	75	100
VD300-4T-90G	VD300-4T-90P	116.0	180.0	176.0	90	110
VD300-4T-110G	VD300-4T-110P	138.0	214.0	210.0	110	150
VD300-4T-132G	VD300-4T-132P	167.0	256.0	253.0	132	175
VD300-4T-160G	VD300-4T-160P	200.0	307.0	304.0	160	210
VD300-4T-185G	VD300-4T-185P	231.0	350.0	326.0	185	240
VD300-4T-200G	VD300-4T-200P	250.0	385.0	377.0	200	260
VD300-4T-220G	VD300-4T-220P	280.0	430.0	426.0	220	300
VD300-4T-250G	VD300-4T-250P	315.0	468.0	465.0	250	350
VD300-4T-280G	VD300-4T-280P	355.0	525.0	520.0	280	370
VD300-4T-315G	VD300-4T-315P	396.0	590.0	585.0	315	500
VD300-4T-355G	VD300-4T-355P	445.0	665.0	650.0	355	420
VD300-4T-400G	VD300-4T-400P	520.0	785.0	725.0	400	530
VD300-4T-450G	VD300-4T-450P	565.0	883.0	820.0	450	600
VD300-4T-500G	VD300-4T-500P	630.0	890.0	860.0	500	660
VD300-4T-560P		700.0	990.0	950	560	750

Technical Specifications

Item		Specifications
Input	rated voltage	Rated voltage class 220Vor 380V: voltage continuous fluctuation ±10%, short fluctuation -15%~+10%, voltage unbalance<3%, deformation rate meet IEC61800-2 requirement.
	rated input current	Refer to table 2-1
	Rated frequency	50/60Hz, fluctuation range ±5%
Output	Standard adaptive motor	Refer to table 2-1
	Rated capacity	Refer to table 2-1
	Rated current	Refer to table 2-1
	Output voltage	Under rated input condition, output 3phase, 0V~rated input voltage, deviation<±3%
	Highest frequency	0Hz~650Hz
	Carrier frequency	1.0KHz~16KHz, auto-adjust carrier frequency
	Input frequency resolution	0.01Hz(digit setup mode)
	Control mode	Non-PG vector control mode 0, non-PG vector control mode 1, linear V/F, parabola V/F, multi-stage V/F, V/F separation
	Start torque	0.25Hz/150%(vector control)

Main Control Functions	Motor type	asynchronous motor
	Speed range	1:100
	Steady speed precision	±0.2%
	Torque control precision	5%
	Overload capacity	G type motor: 150% rated current for 60sec, 200% rated current for 1sec, P type motor: 120% rated current for 60sec, 150% rated current for 5sec,
	Torque boost	Auto torque boost, manual torque boost by 0.1%~10.0%
	Speed-up/down curve	Linear or S curve speed-up/down mode, 4 types of speed-up/down time, range 0.0s~3600.0s
	DC brake	DC brake frequency: .000Hz~max output frequency, brake time: 0.0s~60.0s, brake current: 0.0%~100.0%
	Jogging control	Jogging frequency range: 0.00Hz~max output frequency, jog speed-up/down time 0.0s~3600.0s
	Easy PLC, multi-stage speed running	Via built-in PLC or control terminal can realize max 16stage speed running
	Built-in PID	Can realize process control conveniently
	Auto voltage adjust(AVR)	When grid voltage changes, can keep output voltage steadily automatically
	Current suppression	If load changes, inverter can limit output current value automatically, to prevent over current tripping off
	Quick current-limit function	Reduce over current error on max extent, protect inverter normal running
	Dynamic over voltage suppression	Auto suppress energy feedback value while running frequency changes, prevent bus over voltage tripping off.
	Oscillation suppression	Optimize V/F oscillation arithmetic, realize V/F steady operation
	Instantaneous stop not stop	during instant power outrage, motor auto reduce compensation voltage drop to keep inverter running for short time
	Clocking control	Clocking control function: setting time range: 0min-65535min
	Multi-inverter switch	2sets of motor parameter, can realize 2motors switching control
	Support extension	Support multi-function I/O extension card or manufacturer defined MFI port related extension function module
Operation	Command source	Preset by control panel, control terminal preset, communication preset, can be switched by several modes.
	Frequency source	10 types of frequency source, can realize auxiliary frequency tuning flexible, frequency combination
	Input terminal	6 digit terminal input, 1terminal support rapid pulse input on max 100KHZ

		2 analog input terminals；with optional 0//4mA to20mA current input or 0V to 10V voltage input. Extension capacity 3 digital input terminals and 1 analog input terminals
	Output terminal	2 analog output terminals；with optional 0//4mA to20mA current output or 0V to 10V voltage output. 2 digit output terminals；one supporting 0.01KHz~100KHz square signal rapid pulse output 2 relay output terminal Extension capacity 1 digit output terminal
Display and Keypad Operation	LED display	Can display 5 digit
	Protection function	Motor power-on short circuit test, input output phase loss protection, over current protection, over voltage protection, under voltage protection, overheat protection, overload protection etc.
Environment	Application site	Indoor, without direct sunlight, no powder, corrosive gas, combustible gas, oil dust, water steam, water drop or salt etc.
	Altitude level	Less than 2000m(altitude higher than 2000M, need to derating inverter power）
	Environment temperature	-10℃-+40℃(if under 40℃-50℃, need to derating inverter power)
	Humidity	<95%RH, no water drop condensed
	Vibration	<5.9m/s2 (0.6g)
	Storage temperature	-20℃- +60℃
Protection grade		IP20
Cooling method		Forced air cooling

2.5 Physical Appearance and Main Structure Diagram

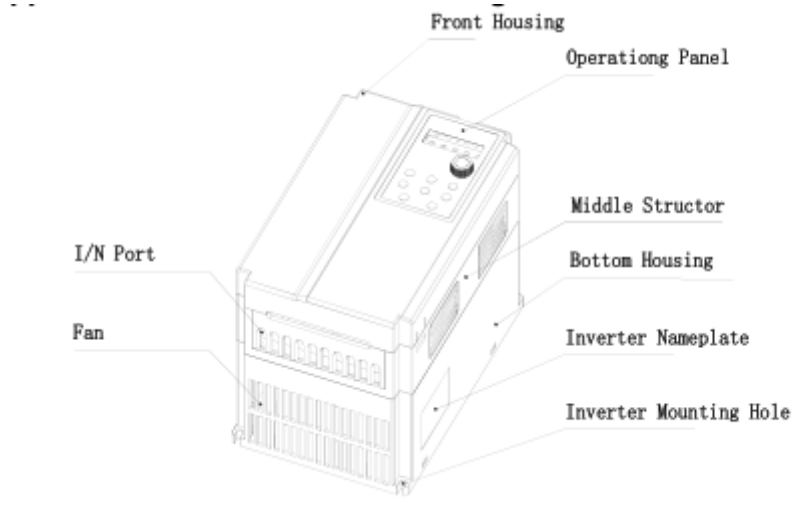


Fig.2.5-1 Physical Appearance and Main structure diagram

2.6 Product appearance and installation dimension

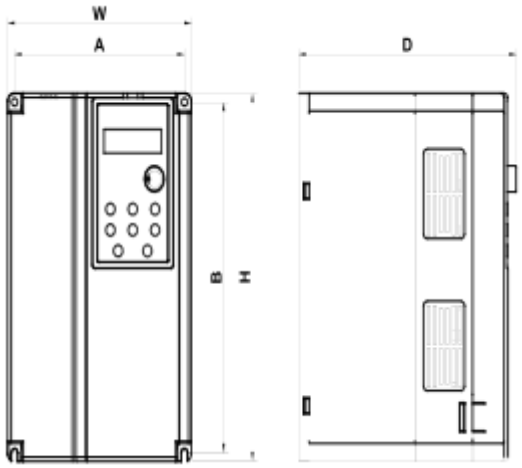


Fig2.6-1Schematic Diagram for Physical Dimensions and Mounting Dimensions(7.5KW)

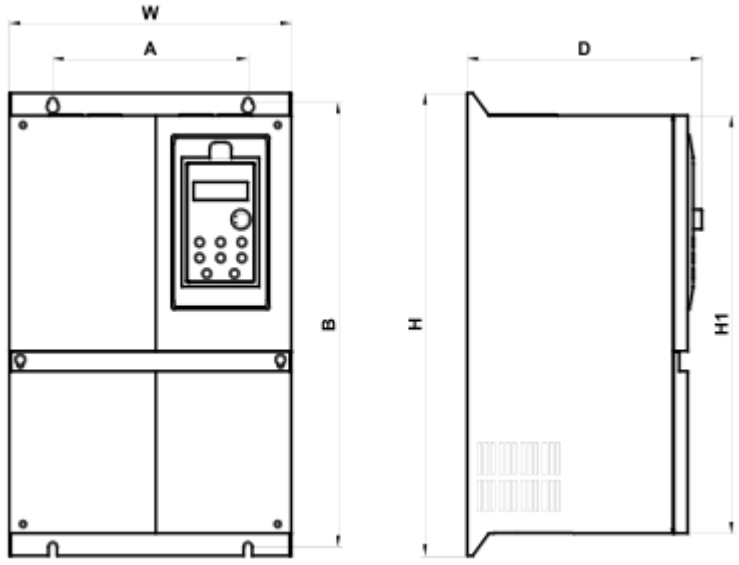


Fig2.6-2Schematic Diagram for Physical Dimensions and Mounting Dimensions(11kW~110kW）

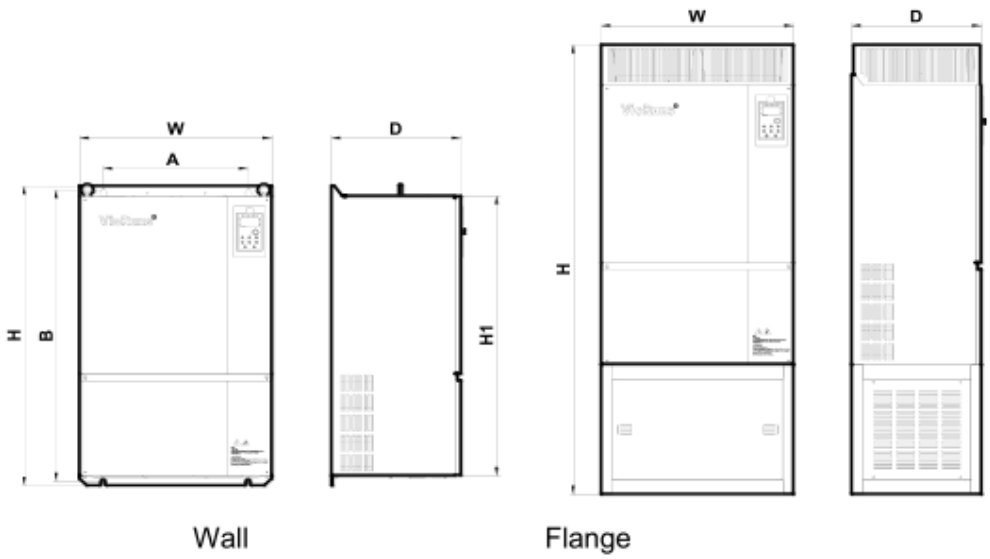


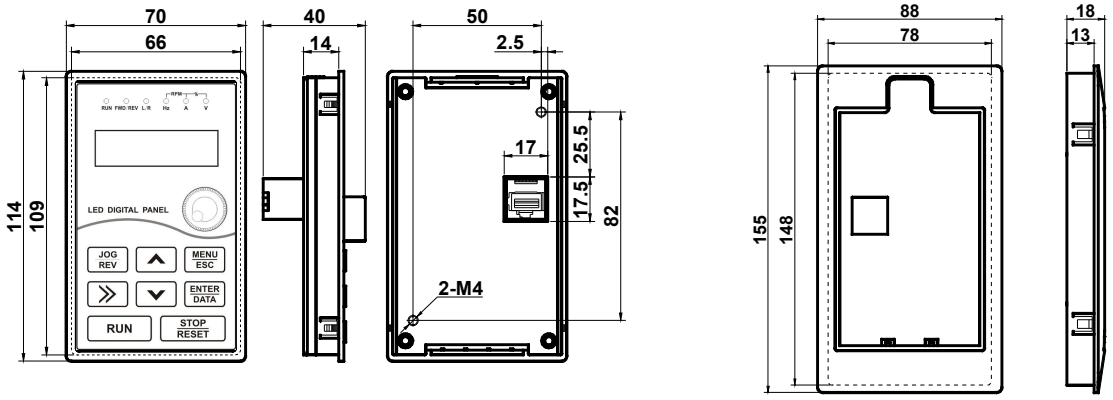
Fig2.6-3Schematic Diagram for Physical Dimensions and Mounting Dimensions (up 132KW)

Table2-3 Physical Dimensions and Mounting Hole Dimensions (mm)

Model	Mounting Hole mm		Physical Dimensions mm				Mounting hole mm	Gross weight Kg
	A	B	H	H1	W	D		
Single phase 220V, 50/60HZ								
VD300-2S-0.7GB	106.5	175	185	/	118	165.5	4.5	1.8
VD300-2S-1.5GB								
VD300-2S-2.2GB							5.5	3.0
VD300-2S-3.7GB	148	235	247	/	160	189.5		
VD300-2S-5.5GB							5..5	3.0
3phase 380V, 50/60Hz								
VD300-4T-0.7GB	106.5	175	185	/	118	165.5	4.5	1.8
VD300-4T-1.5GB								
VD300-4T-2.2GB								
VD300-4T-3.7GB/5.5PB	148	235	247	/	160	189.5	5.5	3.0
VD300-4T-5.5GB/7.5PB								
VD300-4T-7.5GB/11PB								
VD300-4T-11GB/15PB	120	308	320	284	190	196.5	6.5	7.5
VD300-4T-15GB/18.5PB								
VD300-4T-18.5G/22P	180	396	412	372	260	216.5	8	13.5
VD300-4T-22G/30P								
VD300-4T-30G/37P								

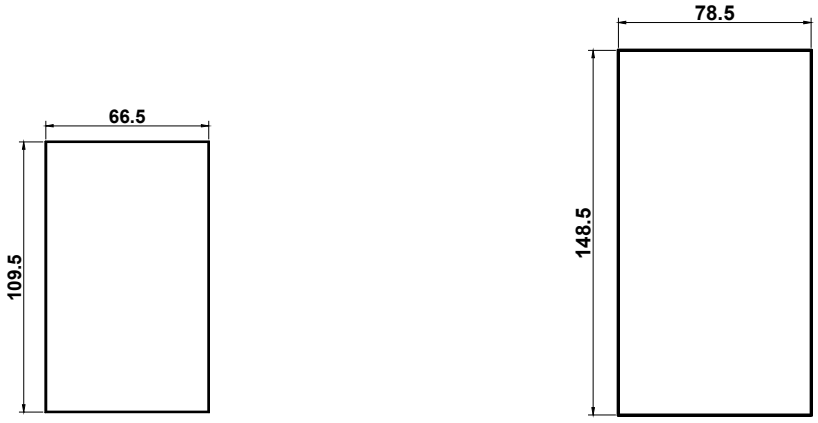
VD300-4T-37G/45P								
VD300-4T-45G/55P	260	530	550	510	377	295	8	30
VD300-4T-55G/75P								
VD300-4T-75G/90P								
VD300-4T-90G/110P	350	670	690	640	450	320	9	55
VD300-4T-110G/132P								
VD300-4T-132G/160P	400	875	900	840	530	360	11	85
VD300-4T-160G/185P			1350					
VD300-4T-185G/200P								
VD300-4T-200G/220P								
VD300-4T-220G/250P	500	970	1000	940	700	380	13	125
VD300-4T-250G/280P			1450					
VD300-4T-280G/315P								
VD300-4T-315G/355P								
VD300-4T-355G/400P	560	1270	1300	124	800	400	13	200
VD300-4T-400G/450P			1750	0				
VD300-4T-450G/500P								
VD300-4T-500G/560P								

2.7 Physical Dimensions of External Keyboard



Physical Dimensions of Keyboard Physical Dimensions of Keyboard holder

Fig 2-7-1 External keyboard and holder dimension



Mounting Hole Dimensions of External Keyboard

Mounting Hole Dimensions of External Keyboard holder

Fig.2-7-2 External keyboard and holder mounting dimension

⚠ Warning
● This inverter keyboard can be directly connected. ● A holder can be added to keyboard, but need to order separately.

2.8 Brake unit model selection guide

2.8.1 resistor value selection

While braking, the recycling energy of motor nearly all consumed on brake resistor.

According to formula U*U/R=Pb

In formula U---brake voltage when system is steadily braking (different system with different value, for AC380V system, it generally take DC700V)

Pb----brake power

2.8.2 brake resistor power selection

Theoretically, brake resistor power is the same with brake power, but considering derating to 70%,

According to formula: 0.7Pr=Pb*D

Pr----power of resistor

D----brake frequency(percentage of regenerating process account for the complete process)

Elevator----20%~30%

Uncoiling and recoiling----20%~30%

Centrifuge----50%~60%

Accidental brake loading----5%

General take 10%

Table 2-4 Inverter brake unit selection

Model	Resistance Value of Brake Resistor	Power of Brake Resistor	Brake unit	Remarks
Single-phase 220V 50/60Hz				
VD300A-2S-0.7GB	80W	≥150Ω	Built-in	No special instructions
VD300A-2S-1.5GB	100W	≥100Ω		
VD300A-2S-2.2GB	100W	≥70Ω		
VD300A-2S-3.7GB	200W	≥40Ω		
VD300A-2S-5.5GB	300W	≥25Ω		
Three phase 380V 50/60Hz				
VD300A-4T-0.7GB	150W	≥300Ω	Built-in	NO special instructions
VD300A-4T-1.5GB	150W	≥220Ω		
VD300A-4T-2.2GB	250W	≥200Ω		
VD300A-4T-3.7GB/5.5PB	300W	≥130Ω		
VD300A-4T-5.5GB/7.5PB	400W	≥90Ω		
VD300A-4T-7.5GB/11PB	500W	≥65Ω		
VD300A-4T-11GB/15PB	800W	≥43Ω		
VD300A-4T-15GB/18.5PB	1000W	≥32Ω		
VD300A-4T-18.5G/22P	1300W	≥25Ω	External	VDBU-35-B
VD300A-4T-22G/30P	1500W	≥22Ω		
VD300A-4T-30G/37P	2500W	≥16Ω		
VD300A-4T-37G/45P	3.7kW	≥16Ω	External	VDBU-35-B
VD300A-4T-45G/55P	4.5kW	≥16Ω	External	VDBU-35-B
VD300A-4T-55G/75P	5.5kW	≥8Ω	External	VDBU-70-B
VD300A-4T-75G/90P	7.5kW	≥8Ω	External	VDBU-70-B
VD300A-4T-90G/110P	9.0kW	≥4Ω	External	VDBU-70-B×2
VD300A-4T-110G/132P	11kW	≥4Ω	External	VDBU-70-B×2
VD300A-4T-132G/160P	13kW	≥4Ω	External	VDBU-70-B×2
VD300A-4T-160G/185P	16kW	≥2.5Ω	External	VDBU-200-B
VD300A-4T-185G/200P	18kW	≥2.5Ω	External	VDBU-200-B
VD300A-4T-200G/220P	20kW	≥2.5Ω	External	VDBU-200-B
VD300A-4T-220G/250P	22kW	≥2.5Ω	External	VDBU-200-B
VD300A-4T-250G/280P	25kW	≥1.5Ω	External	VDBU-200-B×2
VD300A-4T-280G/315P	28kW	≥1.5Ω	External	VDBU-200-B×2
VD300A-4T-315G/355P	32kW	≥1.5Ω	External	VDBU-200-B×2
VD300A-4T-355G/400P	35kW	≥1.5Ω	External	VDBU-200-B×2
VD300A-4T-400G/450P	42kW	≥1.0Ω	External	VDBU-200-B×3
VD300A-4T-450G/500P	45kW	≥1.0Ω	External	VDBU-200-B×3
VD300A-4T-500G/560P	50kW	≥1.0Ω	External	VDBU-200-B×3

⚠ Warning

● Table 2-4 is a guiding data, user can select different resistor value and power according to actual situation.

● Selection of brake resistor is based on the motor generation power in actual application system, it is related with system inertia, speed reduce time, potential load Energy, it is decided by user's actual situation.
● System inertia is bigger, the required speed reducing time is shorter, the braking is more frequent, so the brake resistor require a bigger power small value of resistor.

2.9 Routine Repair and Maintenance of inverter

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the devices in the inverter, which may cause potential fault of the inverter or reduce the service life of the inverter. Therefore, it is necessary to carry out routine and periodical maintenance on the inverter, it must be regularly maintenanced for every 3~6 months.

2.9.1 Daily tour inspection

Inspection items:

⚠ Warning

● if the heat from motor and the running inverter is higher than normal temperature
● if any abnormal noise or vibration from motor and the running inverter
● If current value of inverter loading current is as normal level
● if inverter cooling fan is running as normal, if it is stained with oil dirt and speed getting low.
● If the color of main control circuit terminal changed or rusted, if any arc discharge between input and output phases.
● If the enclosure of inverter is overheat, if inverter inside is filled with dirt or metal powder, or oil dirt on circuit board or conductive copper bar etc.
● If inverter is installed in cabinet, good ventilation is kept, cooling fan is running as normal.

2.9.2 Regular maintenance

Regular maintenance item:

⚠ Warning

● Clear inverter cooling air duct regularly, once the speed of cooling fan inside cabinet getting low or stop, then replace it on time.
● Check if the connecting screws in main circuit and control circuit is loosed, any signs of overheat on connecting copper bar inside inverter.
● Check if the insulation performance of motor and main circuit cable, any insulation damage of main circuit and control circuit, especially the surface contacting with metal has cut.
● Non-professional staff or untrained operator cannot do maintenance or change device of the inverter, failure to comply will result in personal hurt or damage the device.
● User is required to do insulation test on inverter. While testing insulation resistor of motor and cable, make sure to disconnect inverter in advance. Otherwise the inverter can be damaged.
● If user insist to do insulation test on inverter, make sure all the input output terminal of main circuit (L,N,R,S,T,U,V,W,P1,P+,PB,P-) are reliably grounded, use a 500V Meg Ohm Meter to check.
● Donot use a 500V meg ohm meter to check on control circuit terminal, otherwise it can damage inverter.

2.9.3 Inverter wearing part replacement

Some device inside Inverter can get wearing or aged after using for a certain period, in order to ensure inverter operate reliably, it is necessary to do preventive maintenance, when necessary some device need to be replaced.

The wearing part of inverter mainly as cooling fan, filtering big capacity electrolytic capacitor. Those life is closely related with its applicant environment and maintain condition.

⚠ Warning
● in general condition the inverter cooling fan need to replace for every 2-3 years. in general condition the inverter big capacity electrolytic capacitor need to replace for every 4-5 years.

2.9.4 inverter storage

If inverter has to be kept for some tine or long time after purchasing, please pay attention to its storage:

⚠ Warning
● Donot keep it in high temperature, humid or vibrated place with metal powder, and keep good ventilation. ● If inverter kept too long without running, the filter capacitor performance will reduce. For every 2years, the inverter should be powered on to restore the performance of big capacity filter capacitor, check the inverter function. When power on the inverter, an auto-transformer should be applied to upgrade voltage, and power-on time should less than 5hr.

2.10 Warranty introduction

For inverter manufactured from our factory, from on the manufacture date, under normal condition application, if inverter failed or damaged within warranty period, the manufacturer response for repair. If inverter is without in warranty period, user response for reasonable repair charge.

⚠ Warning
● Free warranty only refers to the frequency converter ● Please keep the machine outer packing boxes and other packaging materials, to facilitate future inverter relocation or repair and other logistics transportation

Our company will provide 12-month warranty (starting from the leave-factory date as indicated on the bar code) for the failure or damage under normal use conditions. If the equipment has been used for over 12 months, reasonable repair expenses will be charged.

2.10.1 Reasonable repair expenses will be charged for the following situations within 12 months
①The equipment is damaged because the user fails to comply with the requirements of the user’s manual；
②The equipment is damaged Because the user storage, maintenance and fault ；

③Damage caused when the inverter is used for abnormal function；

④Damage caused by fire, flood and abnormal voltage

Chapter 3 Mechanical and Electrical Installation

3.1 Installation Environment:

The ambient temperature exerts great influences on the service life of the inverter and is not allowed to exceed the allowable temperature range (-10 ℃ Celsius to 40℃ Celsius).

The inverter shall be mounted on the surface of incombustible articles, with sufficient spaces nearby for heat sinking.;

The inverter shall be mounted in locations free from direct sunlight,; The inverter shall be mounted in locations free from high humidity and condensate，Relative humidity is lower than 95%；

The inverter shall be mounted in locations free from oil dirt, dust, and metal powder；

The inverter shall be mounted in locations free from corrosive gas, explosive gas or combustible gas.

3.2 The installation direction and space

Install the inverter vertically so that the heat may be expelled from the top. to ensure the heat dissipation space of the inverter

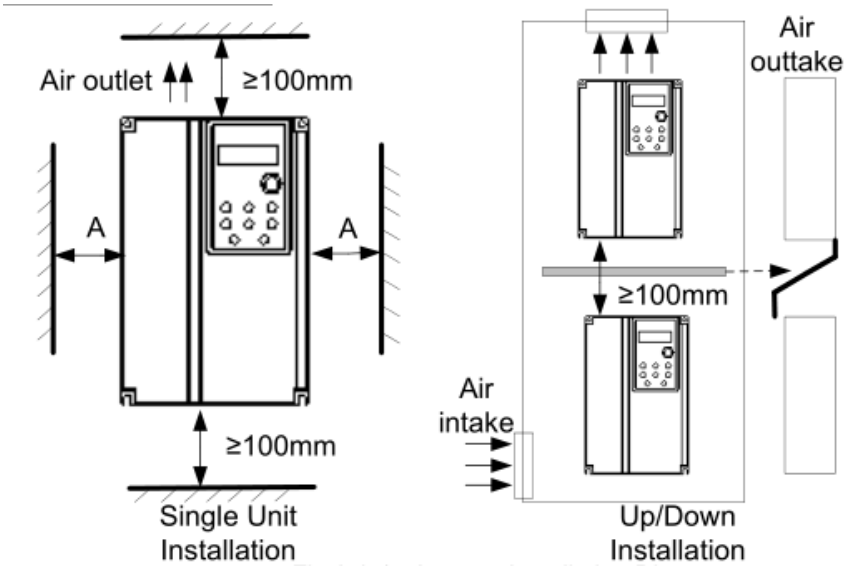


Fig.3-2-1 Inverter Installation Diagram

When Single Unit Installation: When the inverter power is not higher than 15kW, the A size can be omitted. When the inverter power is higher than15kW, the A size shall be higher than 50mm.

When Installation of Upper and Lower Parts: When installing the upper and lower parts of the inverter, the insulating splitter is required.

Power Level	Mounting Dimension	
	B	A
≤15kW	≥100mm	≥50mm
18.5kW—30kW	≥200mm	
≥37kW	≥300mm	

3.3 Removing and Mounting The Cover Plate and Keyboard

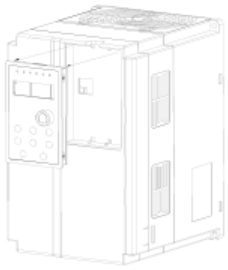


Fig.3.3-1 Removing and mounting the keyboard Diagram

Disassemble of control panel: put the middle finger on upper part of control panel, lightly press the upper clip and pull out.

Installation of control panel: fixing the bottom hook of panel to the install-claw under the tank of panel, put middle finger on upper clip and pull in until it fixed.

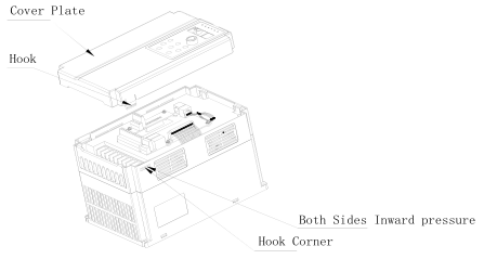


Fig.3.3-2 Removing and mounting the Cover Plate of Plastic Enclosure Diagram

Installation of hook cover: fixing the bottom hook of panel to the install-claw under the tank of panel, put middle finger on upper clip and pull in until it fixed.

The hooker of the lower cover plate is easy to pull out with tools by forces inside.

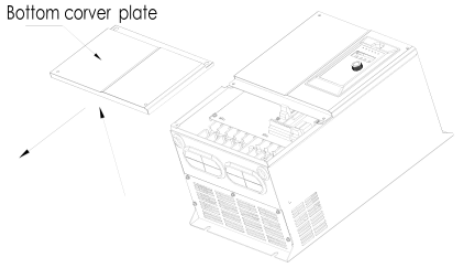


Fig 3.3-3 Removing and Installing the Cover Plate of Sheet-Metal Enclosure

Disassembly and installation of sheet-metal enclosure: with cross screwdriver to screw off t he two screws at the bottom of the under cover plate, then loosen the two screws at the t op of the under cover plate, pull-down the under cover plate can be disassemble, reverse order the under cover plate can be install.

3.4 Inverter and External Electrical Parts Connection

3.4.1 Schematic Diagram for Inverter and external electrical parts Connection:

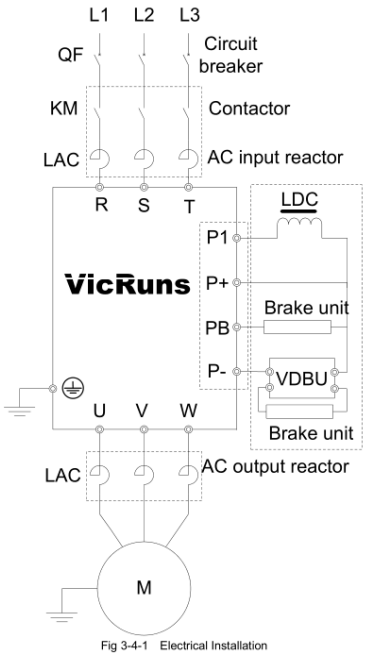


Fig 3.4-1 Inverter and external units connection diagram

Table 3-1 the peripheral devices

Circuit breaker	Disconnect the power supply when the equipment at the lower part is over current
	Connection and disconnection of inverter. Frequent power-on and power-off operations on the inverter shall be avoided.
AC input reactor	1 Improve the power factor of the input side; ● Eliminate the higher harmonics of the input side effectively and prevent other equipment from damaging due to distortion of voltage wave. ● Eliminate the input current unbalance due to unbalance between the power phases.
Thermo protection relay	Although the inverter motor with overload protection function, but when an inverter driving two or more motor or driven multi pole motor, in order to prevent overheating of the motor accident, please install thermal protection relay in the converter and each motor and the motor overload protection P13.00 parameter is set to "1" (motor protection is invalid)
DC reactor	Improve the power factor of the input side; ● Improve the whole efficiency and thermal stability of the inverter. ● Eliminate the impact of higher harmonics of the input side on the inverter and reduce the external conduction and radiation interference
Braking assembly	The dotted box type G 15kW and the following models built in braking unit, did not elicit P1 terminal; G 18.5kW and above models without built-in braking unit, no PB terminal.
Protective earth	The memory of the leakage current of inverter, in order to ensure the safety of the inverter and motor must grounding, grounding resistance should be less than 10. The grounding wire should be as short as possible, wire

	diameter should conform to table 3-3 standard Note: the data in the table in only two conductors using the same metal case is correct, if not so, protective conductor cross-sectional area should be through the method of conductivity coefficient equivalent using the determined.

Table 3-2 The recommended fuse capacity and copper core insulation wire section

Power	Protector Fuse（A）	Power	Protector Fuse（A）	Power	Protector Fuse（A）
7.5 kW	20	75 kW	200	280 kW	800
11 kW	32	90 kW	250	315 kW	1000
15 kW	35	110 kW	315	355 kW	1000
18.5 kW	50	132 kW	400	400 kW	1250
22 kW	63	160 kW	450	450 kW	1500
30 kW	80	185 kW	560	500 kW	1800
37 kW	100	200 kW	560	560 kW	2000
45 kW	125	220 kW	630		
55 kW	160	250 kW	800		

Table 3-3 Conductor cross-sectional area

conductor cross-sectional area S（mm^2）	The smallest conductor cross-sectional area S（mm^2）
S≤16	S
16＜S≤35	16
35＜S	S/2

3.4.2 Guide to the external electrical parts

Table 3-4 Guide to Prototyping of External Electrical Parts of Inverter

Inverter Model	Circuit Breaker (MCCB) (A)	Recommended Contactor (A)	Recommended Conducting Wire of Main Circuit at the Input Side (mm)	Recommended Conducting Wire of Main Circuit at the Output Side (mm)	Recommended Conducting Wire of Control Circuit (mm
Sigl-phrase 220V 50/60Hz					
VD300A-2S-0.7GB	16	10	2.5	2.5	1.0
VD300A-2S-1.5GB	20	16	4	2.5	1.0
VD300A-2S-2.2GB	32	25	4	4	1.0
VD300A-2S-3.7GB	40	32	6	6	1.0
VD300A-2S-5.5GB	63	40	6	6	1.0
Three-phrase 380V 50/60Hz					
VD300A-4T-0.7GB	10	10	2.5	2.5	1.0
VD300A-4T-1.5GB	16	10	2.5	2.5	1.0
VD300A-4T-2.2GB	16	10	2.5	2.5	1.0
VD300A-4T-3.7GB/5.5PB	25	16	4	4	1.0
VD300A-4T-5.5GB/7.5PB	32	25	4	4	1.0
VD300A-4T-7.5GB/11PB	40	32	4	4	1.0
VD300A-4T-11GB/15PB	63	40	4	4	1.0
VD300A-4T-15GB/18.5PB	63	40	6	6	1.0
VD300A-4T-18.5G/22P	100	63	6	6	1.5
VD300A-4T-22G/30P	100	63	10	10	1.5
VD300A-4T-30G/37P	125	100	16	10	1.5
VD300A-4T-37G/45P	160	100	16	16	1.5
VD300A-4T-45G/55P	200	125	25	25	1.5
VD300A-4T-55G/75P	200	125	35	35	1.5
VD300A-4T-75G/90P	250	160	50	50	1.5
VD300A-4T-90G/110P	250	160	70	70	1.5
VD300A-4T-110G/132P	350	350	95	95	1.5
VD300A-4T-132G/160P	400	400	150	150	1.5
VD300A-4T-160G/185P	500	400	185	185	1.5
VD300A-4T-185G/200P	630	400	240	240	1.5
VD300A-4T-200G/220P	630	630	150*2	150*2	1.5
VD300A-4T-220G/250P	630	630	150*2	150*2	1.5
VD300A-4T-250G/280P	800	630	185*2	185*2	1.5
VD300A-4T-280G/315P	800	800	150*3	150*3	1.5
VD300A-4T-315G/355P	800	800	150*3	150*3	1.5
VD300A-4T-355G/400P	800	800	150*4	150*4	1.5
VD300A-4T-400G/450P	1000	1000	150*4	150*4	1.5
VD300A-4T-450G/500P	1000	1000	150*4	150*4	1.5
VD300A-4T-500G/560P	1250	1250	185*4	185*4	1.5

Table 3-5 AC output and input Reactor DC reactor selection table

Inverter capacity (kW)	AC input reactor		AC output reactor		DC reactor	
	Current (A)	Inductance (MH)	Current (A)	Inductance (UH)	Current (A)	Inductance (MH)
VD300A-4T-0.7GB	5	3.8	5	1.5	/	/
VD300A-4T-1.5GB	5	3.8	5	1.5	/	/
VD300A-4T-2.2GB	7	2.5	7	1	/	/
VD300A-4T-3.7GB/5.5PB	10	1.5	10	0.6	/	/
VD300A-4T-5.5GB/7.5PB	15	1.0	15	0.25	/	/
VD300A-4T-7.5GB/11PB	20	0.75	20	0.13	/	/
VD300A-4T-11GB/15PB	30	0.60	30	0.087	/	/
VD300A-4T-15GB/18.5PB	40	0.42	40	0.066	/	/
VD300A-4T-18.5G/22P	50	0.35	50	0.052	40	1.3
VD300A-4T-22G/30P	60	0.28	60	0.045	50	1.08
VD300A-4T-30G/37P	80	0.19	80	0.032	65	0.80
VD300A-4T-37G/45P	90	0.16	90	0.030	78	0.70
VD300A-4T-45G/55P	120	0.13	120	0.023	95	0.54
VD300A-4T-55G/75P	150	0.10	150	0.019	115	0.45
VD300A-4T-75G/90P	200	0.12	200	0.014	160	0.36
VD300A-4T-90G/110P	250	0.06	2501	0.011	180	0.33
VD300A-4T-110G/132P	250	0.06	250	0.011	250	0.26
VD300A-4T-132G/160P	290	0.04	290	0.008	250	0.26
VD300A-4T-160G/185P	330	0.04	330	0.008	340	0.18
VD300A-4T-185G/200P	400	0.04	400	0.005	460	0.12
VD300A-4T-200G/220P	490	0.03	490	0.004	460	0.12
VD300A-4T-220G/250P	490	0.03	490	0.004	460	0.12
VD300A-4T-250G/280P	530	0.03	530	0.003	650	0.11
VD300A-4T-280G/315P	600	0.02	600	0.003	650	0.11
VD300A-4T-315G/355P	660	0.02	660	0.002	800	0.06
VD300A-4T-355G/400P	400*2	0.04	400*2	0.005	460*2	0.12
VD300A-4T-400G/450P	490*2	0.03	490*2	0.004	460*2	0.12
VD300A-4T-450G/500P	530*2	0.03	530*2	0.003	650*2	0.11
VD300A-4T-500G/560P	600*2	0.02	600*3	0.003	650*2	0.11

3.5 Standard Wiring Diagram

3.5.1 Schematic Diagram for Single-phase Inverter Connection:

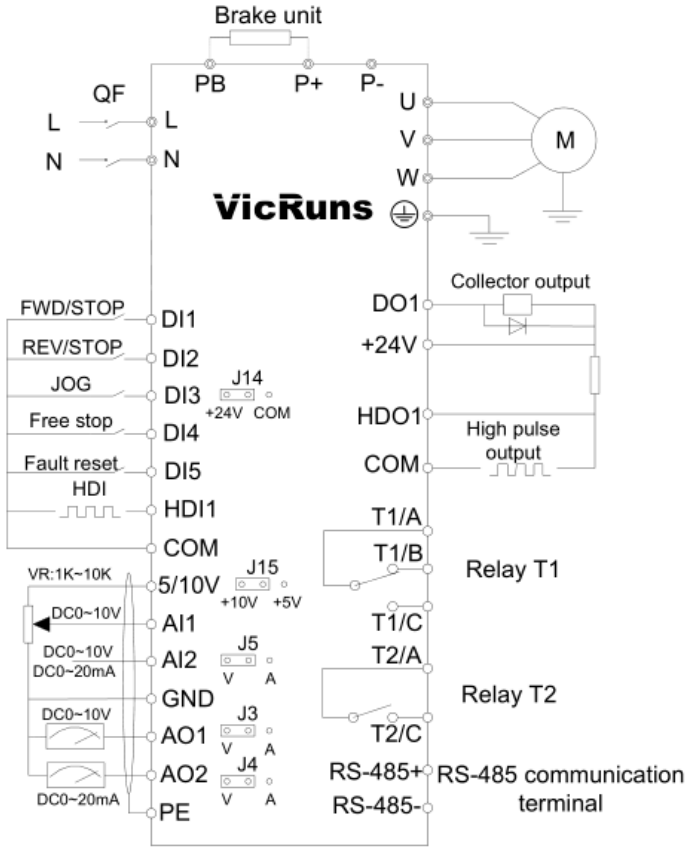


Fig.3.5-1 Schematic Diagram for single phase Inverter Connection

Precautions are as follows:

1）Terminal◎refers to Main circuit terminal, terminal ○ refers to control circuit terminal；

2）B which is followed the product model represents Self-braking unit；

3）Braking resistor’s selection is based on the user demand. refer to Table 2-4;

4）Signal lines and power line must be separated alignments, if you want to control cables and power cable cross, let them cross by 90 degree angle. It is best to choose shielded twisted-pair cabling for analogue signal, the selection of power cable is shield three-core cable(The specification should enlarge a class as much as the ordinary electric cables),or follow the inverter user manual.

3.5.2 Schematic Diagram for Three-phase and lower to 15KW Inverter Connection:

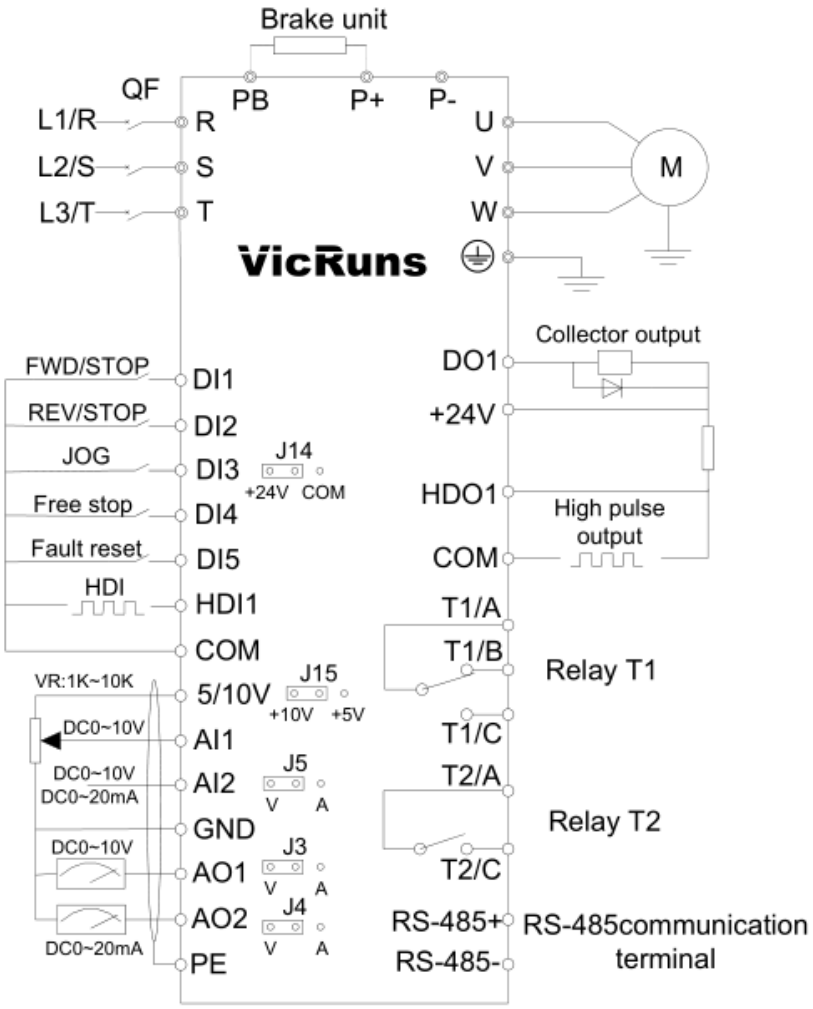


Fig.3.5-2 Schematic Diagram of 3 phase 15KW and below Inverter Standard Connection

Precautions are as follows：

1）Terminal◎refers to Main circuit terminal,terminal ○ refers to control circuit terminal；

2）B which is followed the product model represents Self-braking unit；

3）Braking resistor’s selection is based on the user demand. refer to Fig 2-4;

4）Signal lines and power line must be separated alignments, if you want to control cables and power cable cross, let them cross by 90 degree angle. It is best to choose shielded twisted-pair cabling for analogue signal, the selection of power cable is shield three-core cable(The specification should enlarge a file as much as the ordinary electric cables),or follow the inverter user manual

3.5.3 Schematic Diagram for Three-phase and high than 18.5KW Inverter Connection:

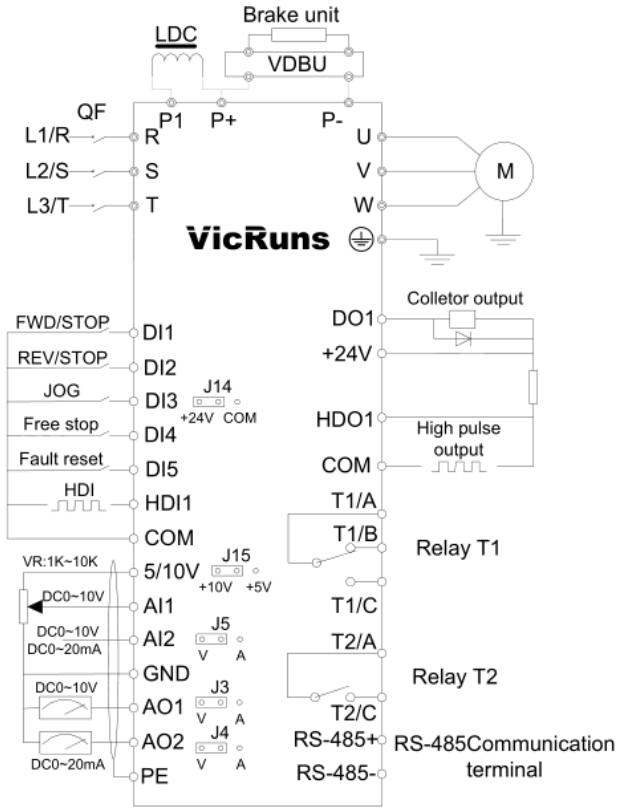


Fig.3.5-3 Schematic Diagram for 3Phase 18.5Kw and above Inverter Standard Connection

Precautions are as follows：

1）Terminal◎refers to Main circuit terminal,Terminal ○ refers to control circuit terminal；

2）B which is followed the product model represents Self-braking unit；

3）Braking resistor’s selection is based on the user demand.refer to Fig 2-4;

4）Signal lines and power line must be separated alignments, if you want to control cables and power cable cross, let them cross by 90 degree angle. It is best to choose shielded twisted-pair cabling for analogue signal, the selection of power cable is shield three-core cable(The specification should enlarge a file as much as the ordinary electric cables),or follow the inverter user manual.

3.6 Main Circuit Terminals

3.6.1 Schematic diagram for connection of main circuit terminals

3.6.1.1 Connection diagram of main circuit for single phase 220V inverter

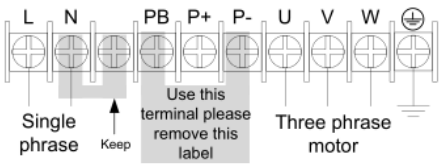


Fig 3.6-1 Connection diagram of main circuit for single phase 220V inverter

3.6.1.2 Connection diagram of main circuit for the inverter of 380v below 2.2KW

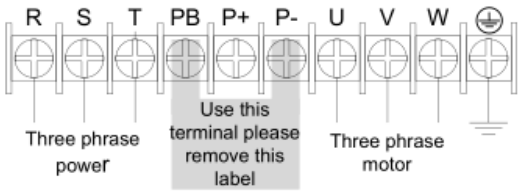


Fig 3.6-2 Connection diagram of main circuit for the inverter of 380V below 2.2KW

3.6.1.3 Connection diagram of main circuit for the inverter of 380v 3.7KW-15KW

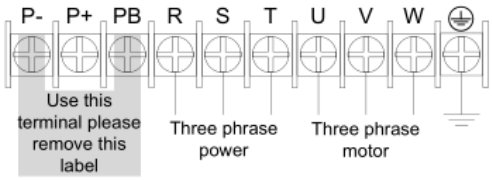


Fig 3.6-3 Connection diagram of main circuit for the inverter of 380V 3.7kw-15kw

3.6.1.4 Connection diagram of main circuit for the inverter of 380v up 18.5kw

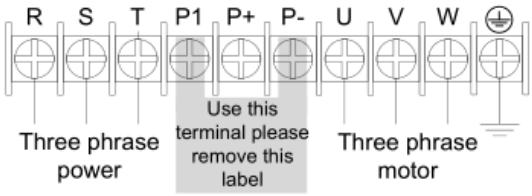


Fig 3.6-4 Connection diagram of main circuit for the inverter of 380V over 18.5kw

3.6.2 Instructions of main circuit terminals of inverter:

Fig3-6 Instructions of main circuit terminals of inverter

Terminals	Function Instruction
L,N	single-phase 220V input terminal, external connection of grid single phase 220V AC power
R,S,T	input terminal of AC 3-phase power, external connection of grid 3phase AC power
U,V,W	output terminal of 3phase power, external connection of AC 3phase motor
P+,P-	Negative and positive terminals of DC power, external connection of brake unit terminal
P+,PB	External connecting of brake resistor terminal
P1,P+	External connection of DC electric reactor terminal
⏚	Earth terminal

⚠ DANGER

● the voltage class of VD300 series inverter 3phase power has 2 class: 220V, 380V, before connecting power, please make sure the power class on inverter nameplate is the same with the accessing power. Otherwise donot connect.

● DC bus P+ P-terminal: take note that when power outrage there is residual voltage on DC bus P+ P- terminal, need to wait for a while until CHARGE LED off. Otherwise it is danger of electric shock.

● When selecting external brake unit, note the polarity of P= P- cannot be reversely connected, otherwise it can result in damage or even fire.

Donot directly connect brake resistor to DC bus, it may result damage or fire.

⚠ WARNING

1) Input power L,N or R, S T: the cable connection at input side of the inverter has no phase sequence requirement.

2) Brake unit cable length should not exceed 10m, twisted pair or double cable parallel wiring should be used.

3)Brake resistor connecting terminal P+ P-: confirm whether the device has built-in brake unit, its brake resistor connecting terminal is effect. The brake resistor selection table2-4 recommending value and the wiring distance should less than 5M. Other it can damage inverter.

4)External DC electric reactor connecting terminal P1 P+: for external DC reactor to 18.5Kw and above power inverter, get rid off the connector between P1 P+ terminal during installation, reactor is installed between the 2 terminal.

5)Inverter output side U V W: the output side cannot connect capacitor or surge absorber, otherwise it will affect inverter in self-protection frequently or damage.

6)In case the motor cable is too long, it may generate electrical resonance easily due to the impact of distributed capacitance, thus damaging the motor insulation or generating higher leakage current to invoke over current protection of the inverter. When the length of motor cable is longer than 100 meters, it needs to install a AC output reactor.

7)Earth terminal PE:

This terminal shall be earthed reliably, with resistance of earth cable of less than 10Ω. Otherwise, it may cause fault or damage the inverter.

Do not share the earth terminal with zero line N terminal, otherwise it will result equipment abnormal running or damage.

3.7 Control Circuit terminal

3.7.1 Control terminals and Functional

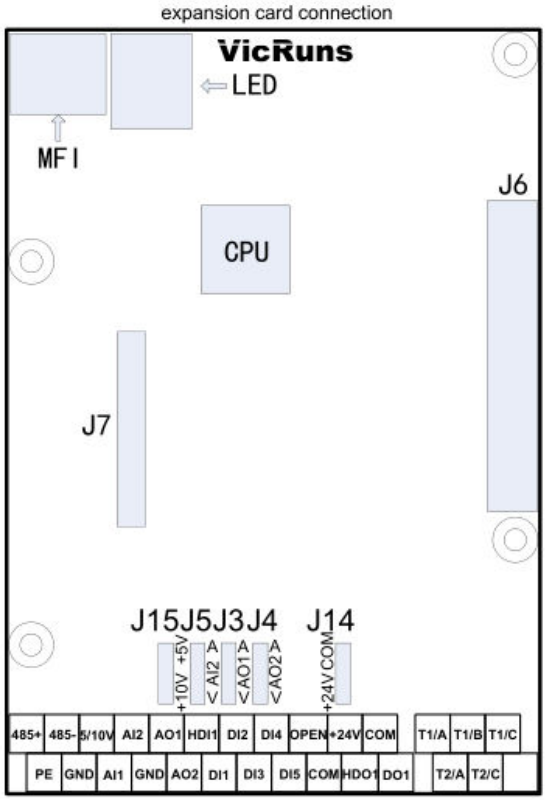


Fig3.7-1 Diagram of main control board and function extension card connection

3.7.2 Function description of control circuit

Table 3-7 Description of Control Terminal Function

Type	Terminal sign	Terminal name	function
Power supply	5V/10V-GND	External 5V/10V power supply	1. provide +5V/10V power supply for external-units, the maximum output current is 20mA. J15 jumper on main control board to select 5V or 10V power output, default is 10V. 2.It is generally used as the operating power supply for the external potentiometer. The potentiometer resistance range is 1kΩ~10KΩ
	+24V-COM	24V power supply	1. Provide +24V power supply for external units. It is generally used as the operating power supply for digital input/output terminals and the external sensor. The maximum output current is 200mA.
	OPEN	External power input terminal	1. Connect to 24V by default, J14 jumper on main control board to select +24V or COM connection. 2. When external power is used to drive DI1~DI5, HDI1, OPEN needs to connect to the external power supply and disconnect J14(disconnecting with +24V/COM).
Communication	485+-485-	RS-485 terminals	Standard RS-485 communication terminal, should use twisted pair cable

Analog input	AI1-GND	Analog input terminal 1	1.Input Voltage range :DC 0V to 10V 2. input resistance ： 22kΩ
	AI2-GND	Analog input terminal 2	1.Input range :DC 0V to 10V or 0/4mA~20mA, can be selected by J5 jumper on main control board. 2. input resistance: under voltage input-22 kΩ, Under current input-500Ω.
Digital input	DI1-COM	Digital input 1	1. Optical coupling isolation, compatible with dual polarity input, internal resistance 3.3kΩ; 2. Multi-function digital input, through P05.01-P05.05 to set function. 3. The inverter default +24v power supply built-in, COM is common terminal. 4. when using external power, JP14 should be suspended, external +24V connect to OPEN, COM is common terminal(external voltage range +24V±10%. 5. internal resistance 1.65 Kω.
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5	
	HDI1-COM	Rapid pulse input terminal	1、when used as general digit input, it it the same function as DI1 to DI5; can combine with OPEN as bipolar rapid pulse input terminal. Max input frequency is 100kHz。 3、When use external power, input voltage range +24V±10%； 4、The internal impedance 1.65 kΩ
Analog output	AO1-GND	Analog output terminal 1	0V~10V voltage and 0/4mA~20mA current output
	AO2-GND	Analog output terminal 2	0V~10V voltage 0/4mA~20mA current output
Digital output	DO1-COM	Digital output 1	1.Optical coupling isolation, dual polarity open collector output 2.Output voltage range: 5V~24V 3.Output current range:2mA~50mA.
	HDO1-COM	Rapid pulse input terminal	1. when used as general digital output, same function as DO1. 2. pull-up voltage range:5V-24V(pull-up impedance range: 0.48 kΩ~10kΩ). 3. output current range: 2mA~50mA
Relay output	T1/A-T1/B	Relay T1 normally closed terminal	Contact driving capacity: AC250V, 3A,DC 30V, 1A
	T1/A-T1/C	Relay T1 normally open terminal	
	T2/A-T2/C	Relay T2 normally open terminal	
ground	PE	Shield cable ground	1. control cable shield grounding, when the

		terminal	interference is big on site or control cable is too long, the PE should be well grounded to reduce EMC affect. 2. PE is not allowed to connect with power N line, otherwise it can damage inverter

3.7.3 Jumper switch function description

Table 3-8 Jumper switch function description

Jumper Code	Jumper wire	Function
J3	A terminal	When jump cap plug connect to A, AO1 terminal select DC0/4mA-20mA current output
	V terminal	When jump cap plug connect to V, AO1 terminal select DC0V-10V voltage output
J4	A terminal	When jump cap plug connect to A, AO1 terminal select DC0/4mA-20mA current output
	V terminal	When jump cap plug connect to V, AO1 terminal select DC0V-10V voltage output
J5	A terminal	When jump cap plug connect to A, AI2 terminal select DC0/4mA-20mA current output
	V terminal	When jump cap plug connect to V, AI2 terminal select DC0V-10V voltage output
J14	24V terminal	When jump cap plug connect to 24V, OPEN terminal connect with +24V, and HDI1, DI1~DI5 with COM short circuit input effective.
	COM terminal	When jump cap plug connect to 24V, OPEN terminal connect with COM, and HDI1, DI1~DI5 with +24V short circuit input effective.
J15	+5V terminal	When jump cap plug connect to +5V, terminal +5V/10V-GND on main board provide power supply +5V
	+10V terminal	When jump cap plug connect to +10V, terminal +5V/10V-GND on main board provide power supply +10V

3.7.4 Jack connection function description

Table 3-9 Jack connection function description

Jack Code	Function	Description
J6	Control board-power board	J6 is connection port of main control board and power board, power board supply power to main control board and is electric signal gateway between the 2 parts
J7	Control board-extension card	J7 is connection port of extension card and main control board, main control board supply power to extension card and is electric signal gateway between the 2 parts
LED	Control board-LED panel	This plug is connection port of main control board and LED panel, main control board supply power to LED panel and is electric signal gateway between the 2 parts
MFI	Control	This plug is connection port of main control board and MFI port,

	board-MFI interface	main control board supply power to MFI port and is electric signal gateway between the 2 parts

3.7.5 Main Control Terminal Wiring Description

3.7.5.1 Digital Input Terminal

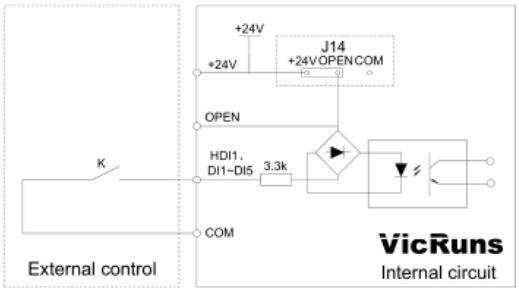


Fig 3.7-2 Schematic Diagram for Connection of Terminal of digital Input

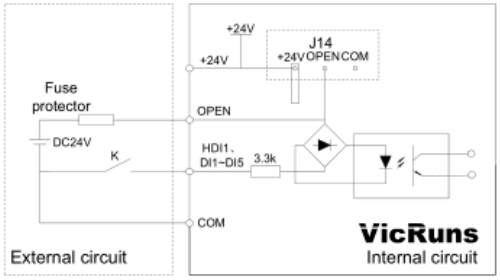


Fig.3.7-3 Diagram of digital input terminal with external power connection

Use external power(power must comply with UL CLASS 2 standard, a 4A fuse protector should be added between power and port), wiring diagram as Fig 3.7-3 showed.(take note to remove the connect wire between J14 jumper OPEN and +24V terminal)

3.7.5.2 Analog input terminal：

Since the weak analog voltage signal is easy to suffer external interferences, it needs to use shielded twist cable generally and the length shall be no longer than 20meters, as shown in Fig. 3.7-4、3.7-5. In case the analog signal is subject to severe interference, and analog signal source side shall be installed with filter capacitor or ferrite magnetic core, as shown in Fig.3.7-6.

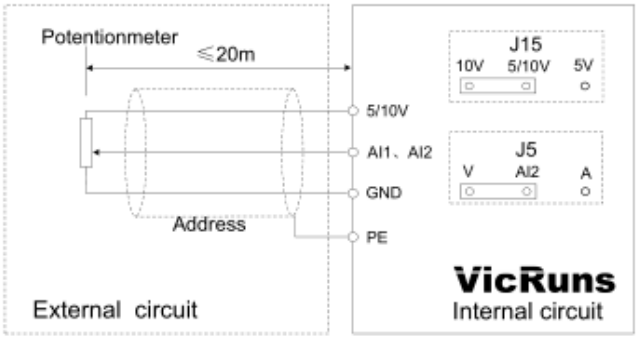


Fig.3.7-4 Schematic Diagram of analog input terminal with voltage signal with shield twist cable

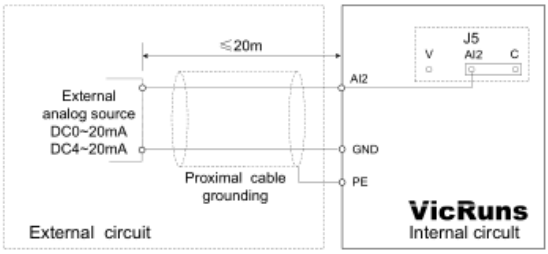


Fig.3.7-5 Schematic Diagram of analog input terminal with current signal with shield twist cable

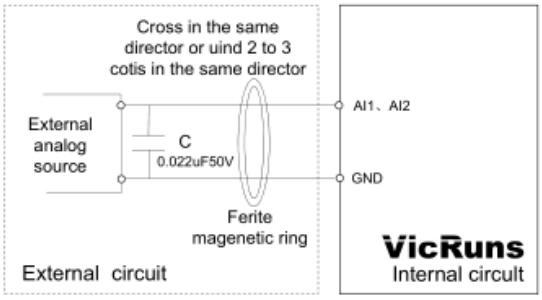


Fig.3.7-6 Schematic Diagram of analog input terminal with Ferrite magnetic ring

3.7.5.3 Digital output terminal using internal power supply

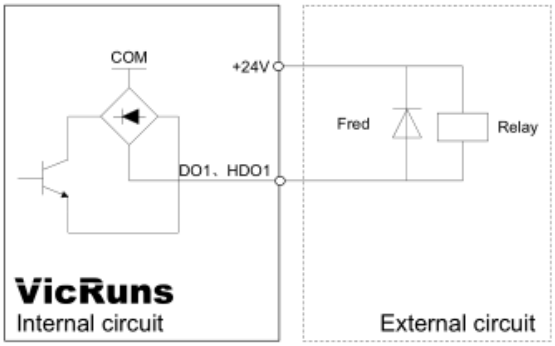


Fig 3.7-7 Schematic Diagram of digital output terminal using internal power supply

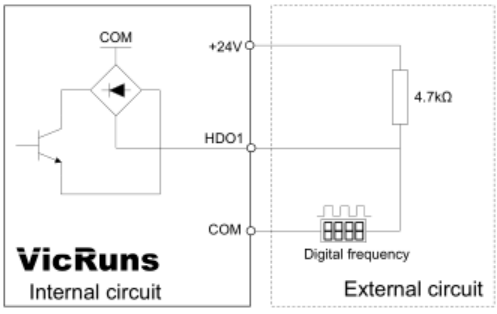


Fig 3.7-8 Schematic Diagram of high speed pulse output terminal using internal power supply

HDO1 in figure 3.7-7 as a digital output terminal (P06.00 set to 1), namely to DO1 function and connection mode are the same

3.7.5.4 Digital output terminal using external power

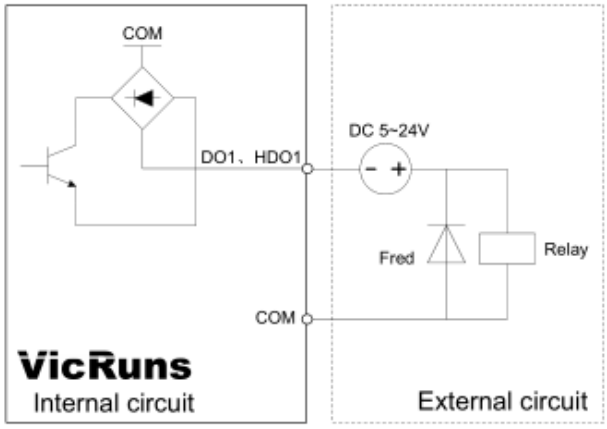


Fig 3.7-9 Schematic Diagram of Digital output terminal using external power

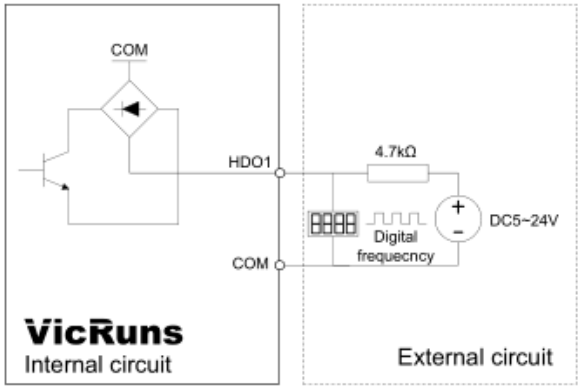


Fig 3.7-10 Schematic Diagram of high speed pulse output using external power

HDO1 Fig 3.7-10 as high speed pulse terminals （P06.00 set to 0）

3.7.5.5 Output terminals of analog

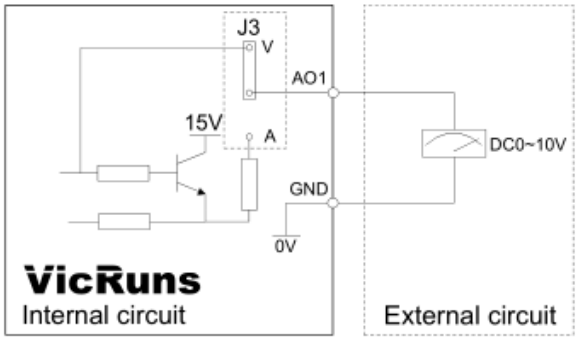


Fig 3.7-11 Schematic Diagram of analog output of voltage signal

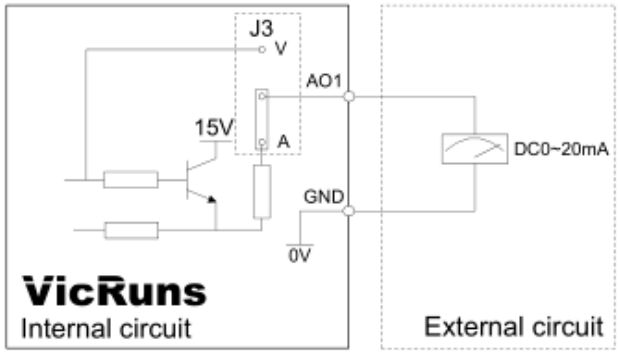
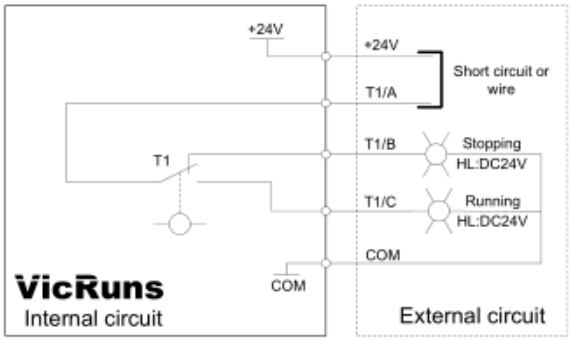


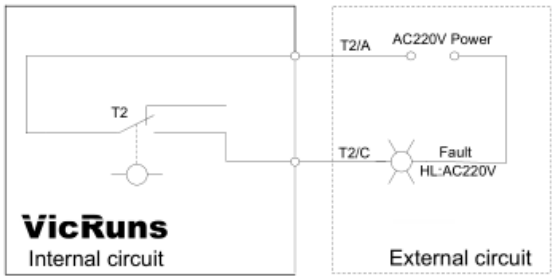
Fig 3.7-12 Schematic Diagram of Terminal of analog output of current signal

3.7.5.6 Output terminals of relay



A use internal DC24V power

A use internal DC24V power



B use external AC220V power

Fig 3.7-13 Schematic Diagram of relay output terminal

Chapter 4 Operation and Display

4.1 Introduction to Operation and Display Interface

With the operation panel, it can perform such operations on the inverter as function parameter modification, inverter working status monitoring and inverter running control (startup and stop). Refer to Fig.4-1 for the physical appearance and functional zone of the operation panel：

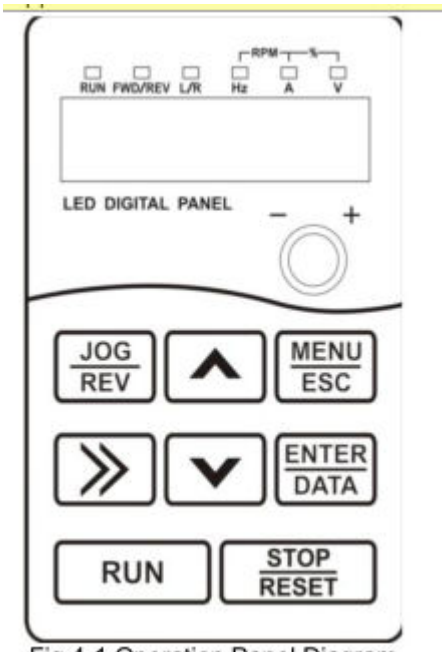


Fig.4-1 Operation Panel Diagram

4.1.1Keyboard button description

Button	Name	Fuction description
MENU ESC	Programming key	Entry and exit of primary menu, deletion of shortcut parameter
ENTER DATA	Confirmation key	Enter the menu interfaces level by level, and confirm the set parameters
∧	（UP）	Increase of the data or function code
∨	（DOWN）	Decrease of the data or function code
≫	Shift key	Select the displayed parameters in turn on the stop display interface and running display interface, and select the modification digit of parameters when modifying parameters
RUN	Running key	It is used to start the running of the inverter under keyboard control mode.
STOP RESET	Stop/reset	Press this button to stop the running in the running status and reset the operation in the fault alarm status. These button characteristics are limited by the function code P10.00.
JOG REV	Dynamic / positive inversion switch key	Dynamic / positive inversion /switch key

4.1.2 Description of Function LED Indictor

Name	Description
RUN	When it is OFF, it indicates the inverter is in stop status; when it is ON, it indicates the inverter is in rotation status；Light flashes that inverter in automatic tuning.
FWD/REV	It is the LED indictor for forward/reverse rotation. When it is ON, it indicates the inverter is in forward rotation status; when it is OFF, it indicates the inverter is in reverse rotation status.
L/R	When it is OFF, it indicates the keyboard operation control status; when it is ON, it indicates the terminal operation control status; when it flashes, it indicates the remote operation control status.
Hz	the unit of frequency（Hz）
A	the unit of current（A）
V	the unit of voltage.（V）
RPM	the unit of rotation speed unit（RPM）
%	unit：%

4.1.3 Description of Function Code Viewing and Modification Methods

The operation panel of the inverter adopts three-level menu structure to carry out operations such as parameter setting.

The three-level menu includes function parameter set (level 1 menu)→Function code (level 2 menu)→Function code setup value (level 3 menu). Refer to Fig.4.1-2 for the operation procedure.

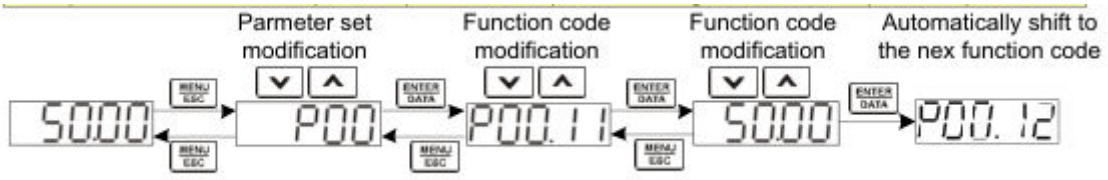


Fig 4.1-2 Operation Procedure of Three-level Menu

When operating on level 3 menu, press MENU/ESC key or ENTER/DATA key to return to level 2 menu. The difference between them is described as follows:

Pressing ENTER/DATA KEY will save the setup parameter and return to the level 2 menu and then automatically shift to the next function code, while pressing MENU/ESC key will directly return to level 2 menu without saving the parameter, and it will return to the current function code.

In level 3 menu status, while one bit flashing user can change its value via ^/v. If there is 2bit need change then press >> to shift to the desired bit for value revise. If the parameter has no flashing bit, it means it is unchangeable. Reason as following:

1）The function code is an unchangeable parameter, such as actual detection parameter, running record parameter, etc.

2）The function code cannot be modified in running status. It can be modified only after the unit is stopped.

4.1.4 keypad displaying：

The keypad displaying is divided into stopping states parameter, running state parameter, function code parameter editing state and fault alarm state and so on

1、Displayed state of parameter

when the inverter is in the stopping state ,the keyboard will display stopping parameters which is shown in figure. The 3bits on right indicator stand for the unit of the parameter, the 3bits on left indicator stand for current status. Such as, the running direction signal is reverse, then FWD/REV light on. Select check menu(also called user setup/user customize), only display the function code which is different from parameter setup value and manufacturer value, press ^/v to view which parameter are changed by user.

Press>> to display stop status parameter recycling. Function code P10.05 defines stop status parameter.

2、Displayed state of running parameters

After the inverter receives valid running commands ,the inverter will enter into the running state and the keypad will display the running parameters. RUN is on while the FWD/REV is determined by the current running direction which is shown as flow.

Press>> to display running status parameter recycling. Function code P10.03 P10.04 defines running status parameter.

3. Function code editing status

In stop/running/error alarm status, press MENU/ESC can enter into edit status(if with password then input it, refer to P29.00). Edit status has 2 levels menu in sequence: function code group or function code----function code parameter, press ENTER/DATA enter into function parameter display status. In function parameter display status, press ENTER/DATA to save and jump to the next parameter, press MENU/ESC to quit to previous parameter.

4.2 Motor Parameter Self-learning

Select vector control mode, before running inverter, must input the parameter from the nameplate of the motor, VD300 series inverter will match standard motor parameter according to this message. Vector control mode is highly dependant on motor parameter, so to acquire good control performance, it needs correct motor parameter.

Pay attention to below points during motor parameter self-learning.

1) firstly to set running command source parameter P00.01=0 as control panel command channel, if motor self-learning required, then remove motor loading.

2) input motor nameplate parameter correctly, including rate power/rate voltage/rate current/rate frequency/rate RPM, its corresponding function code P02.01~P02.05. If select motor 2, corresponding function code P20.01~P20.05

3) via set function code P00.23 to select self-learning type, press ENTER/DATA to confirm displayed “-TUN-“. Press RUN to start motor self-learning, and RUN light on. Once it is completed, LED will display “END”.

4) After motor self-learning check P02.10 parameter, generally this value less than 60% of rate current P02.03, if not it is abnormal, need to do self-learning again, and confirm if motor is with empty loading.

5) When it is unavailable to get motor nameplate message, manufacturer set value can be used. It is only need to input motor power(motor 1 is P02.01, motor 2 is P20.01), no need motor self-learning.

6) If need to get the motor self-learning result recovered to manufacturer value, only need to revise motor rate power(motor 1 is P02.01, motor 2 is P20.01) then change back to required power, the parameter after self-learning can recover to manufacturer value automatically.

7) during self-learning process to press STOP/RESET to stop self-learning. Note the start/stop of self-learning can only be operated by control panel. After self-learning, the function code recover to 0.

4.3 Password Setting ：

The VD300 inverter provides user password protection function. When P29.00 is set to non-zero value, it indicates the user password, and the password protection turns valid after exiting the function code editing status. When pressing PRGMENU/ESC key again, “------“ will be displayed, and common menu cannot be entered until user password is input correctly.

4.4 Parameter Lock (authority lower than password)

VD300 series inverter provide user parameter lock protection, when P00.21 is 1, lock is effective, if P00.21 is 2, cannot change P29.01. Without setting user password, it can protect user parameter or prevent user get parameter initialized.

Chapter 5 Function Parameter Table

This chapter provides only simple function parameters, function parameters in detail please refer to the VD300 or VD500 series product specifications, Or can consult our technical staff.The symbols in the function table are described as follows（M-D）:

○——It indicates that the parameter setup value can be modified when the inverter is in stop status and running status；

◎——It indicates that the parameter setup value cannot be modified when the inverter is in the running status；

●——It indicates that the numerical value of the parameter is the actually measured value, which cannot be modified；

☆——It indicates this parameter is “Factory default parameter” and can be set only by the manufacturer.

P00 basic function parameter group				
P00.00	Motor running mode	0：Straight V/F control mode 1：No-PG vector control mode 0 2：No-PG vector control mode 1	0	◎
P00.01	Running command source	0 ： Operation panel running command channel (L/R OFF) 1： Terminal command channel (L/R ON) 2：communication command channel (L/R flashes)	0	○
P00.02	Main frequency source A selection	0：Keypad potentiometer 1：function code P00.11 2：AI1 3：AI2 4：AI3(extension card) 5：PLC 6：MS speed 7：High speed PULSE input 8：PID control setup 9：Communication setup	0	
P00.03	Main frequency source B selection		4	
P00.04	Frequency Command overlay	0：Main frequency source A 1：Main frequency source B 2：Main frequency source A+B 3：Main frequency source A-B 4：MAX（A，B） 5：MIN（A，B）	0	
P00.05	Frequency command Source B range	0： Relative to maximum frequency 1： Relative to frequency source A	0	
P00.07	Maximum frequency	P00.09~650.00Hz	50.00Hz	
P00.09	Running frequency upper	P00.10~P00.07	50.00Hz	

	limit			
P00.10	Running frequency lower limit	0.00Hz~P00.09	0.00Hz	
P00.11	Keypad set frequency	0.00Hz~P00.07 (max output frequency)	50.00Hz	
P00.12	MS command stage 0 command source	0: function code P11.00 1: function code P00.11 2: AI1 3: AI2 4: AI3(extension card) 5: high speed pulse 6: PID control set	0	
P00.14	Speed-up time 0	0.0s~3600.0s	Model dependant	
P00.15	Speed-down time 0	0.0s~3600.0s	Model dependant	
P00.16	Speed-up/speed-down Time reference frequency	0：max output frequency 1：setup frequency	0	
P00.17	Running direction	0：Direction is default 1；Direction is reverse	0	
P00.18	Reverse control	0：Allow reverse 1：Forbid reverse	0	
P00.19	Carrier frequency	1.0kHz~16.0kHz	Model dependant	
P00.21	Parameter LOCK selection	0：lock invalid 1：lock valid, not permit to change other parameters except the current one 2：not permit operating parameter initializing function code	0	
P00.22	Inverter G/P type	0：G model 1： P model	0	
P00.23	Motor parameter auto tuning	0： No operation 1：Dynamic self learning 2： static auto tuning	0	
P00.24	AVR function selection	0： Invalid 1： valid	1	
P00.25	Overmodulation choice	0x00~0x11 LED the unit bit: 0: overmodulation invalid 1: overmodulation valid LED the decade bit: 0: overmodulation light	0x01	

		1: overmodulation depth		
P00.26	Motor 1 and motor 2 selection channel	0：Function code P00.27 1：Terminal 2： Communication	0	
P00.27	motor selection by keypad setup	0: motor 1 1: motor 2	0	
P00.28	Load type selection(only valid for V/F)	LED the unit bit: motor 1 load type selection 0: non-inertia load 1: inertia load LED the decade bit: motor 2 load type selection 0: non-inertia load 1: inertia load	0x00	
P01 Start/Stop control parameter group				
P01.00	Start mode	0：Direct start 1： DC brake then start 2：Speed tracking then start	0	
P01.01	Direct start initial frequency	0.00Hz~10.00Hz	0.50Hz	
P01.02	Start frequency holding time	0.00s~60.00s	0.00s	
P01.03	DC brake current before start	0.0%~100.0% (inverter rate current)	0.0%	
P01.04	DC brake time Before start	0.0s~60.0s	0.00s	
P01.05	Stop mode	0: Speed-down to stop 1: random stop	0	
P01.06	DC brake beginning frequency at stop	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P01.07	DC brake waiting time at stop	0.00s~60.00s	0.00s	
P01.08	DC brake current at stop	0.0%~100.0%	0.0%	
P01.09	DC brake time at stop	0.00s~60.00s	0.00s	
P01.10	The flux coefficient of brake	0：Invalid 100~150：The greater the coefficient, the greater the braking intensity	0	
P01.11	Short circuit brake current	0.0%~150% (100% relate to inverter rate current)	0.0%	
P01.12	Brake retention time at start short	0.00s~60.00s	0.00s	

	circuit			
P01.13	Brake retention time at stop short circuit	0.00s~60.00s	0.00s	
P01.14	Shifting between FWD/NEV rotation	0： Switch with zero frequency 1： Switch with over starting frequency 2： Switch at stop speed reach and delay	0	
P01.15	Forward/reverse rotation deadzone time	0.0s~3600.0s	0.0S	
P01.16	stopping speed	0.00Hz~100.00Hz	0.50Hz	
P01.17	Detection of stopping speed	0： Detect according to speed set value(no stopping delay) 1 ： Detect according to speed feedback(only valid for vector control）	0	
P01.18	Detection time of the feedback speed	0.0s~100.0s（P01.17=1valid）	0.50s	
P01.19	Delay time of the stop speed	0.0s~100.0s	0.0s	
P01.20	running frequency lower than frequency lower limit action	0: Run with frequency lower limit 1: Stop 2: Zero speed operation	0	
P01.21	Hibernation restore delay time	0.0s~3600.0s （ correspond P01.20=2 is valid）	0.50s	
P01.22	Terminal running protection option when power on	0: Disable terminal run command 1: Enabled terminal run command	0	
P01.23	Restart after power off	0： Disabled restart 1: Enabled restart	0	
P01.24	the waiting time of restart after power off	0.0s~3600.0s (correspond P01.23=1 effective)	1.0s	
P01.25	Start delay time	0.0s~60.0s	0.0s	
P01.26	Speed up/down mode selection	0： line type 1：S Curve	0	
P01.27	Ratio of the s curve Initial segment	0.0%~（100.0%-P01.28） (relate to speed up/down time)	30.0%	

P01.28	Ratio of the s curve End segment	0.0%~（100.0%-P01.27） (relate to speed up/down time)	30.0%	
P02 Motor 1 parameter group				
P02.00	Motor 1 type	0: Common asynchronous motor	0	
P02.01	Motor 1 rated power	0.4kW~1000.0kW	Model dependent	
P02.02	Motor 1 rated voltage	0V~1500V	Model dependent	
P02.03	Motor 1 rated current	0.0A~2000.0A	Model dependent	
P02.04	Motor 1 rated frequency	0.00Hz~650.00Hz	Model dependent	
P02.05	Motor 1 rated rotation speed	0RPM~65535RPM	Model dependent	
P02.06	Motor 1 stator resistance	0.000Ω~65.535Ω	Model dependent	
P02.07	Motor 1 rotor resistance	0.000Ω~65.535Ω	Model dependent	
P02.08	Motor 1 rotor and stator leakage Inductive reactance	0.0mH~6553.5mH	Model dependent	
P02.09	Motor 1 rotor and stator mutual Inductive reactance	0.0mH~6553.5mH	Model dependent	
P02.10	Motor 1 no-load current	0.0A~P02.03(motor 1 rate current)	Model dependent	
P03 motor 1 vector control parameter group				
P03.00	Speed and torque control selection	0： Speed control 1： Torque control	0	
P03.01	speed loop proportional gain 1	0~200.0 whenP00.00=1 set to10.0 whenP00.00=2 set to 20.0		
P03.02	speed loop integration time 1	0.000s~10.000s	0.200s	
P03.03	speed loop parameter switch frequency point 1	0.00Hz~P03.06	5.00Hz	
P03.04	speed loop proportional gain 2	0~200.0 whenP00.00=1 set to 5.0 whenP00.00=2 set to 10.0		
P03.0	Speed loop	0.000s~10.000s	0.100s	

5	integration time 2			
P03.06	speed loop parameter switch frequency point 2	P03.03~P00.07(max output frequency)	10.00Hz	
P03.07	speed loop output filter	0~8(relate to 0~2^8/10ms)	0	
P03.08	Compensation coefficient of vector control slip(motoring condition)	50.0%~200.0%	100.0%	
P03.09	Compensation coefficient of vector control slip(generating condition)	50.0%~200.0%	100.0%	
P03.10	current loop percentage coefficient P	0~60000	1000	
P03.11	current loop integration coefficient I	0~60000	1000	
P03.12	Torque setting method	0：Function code P03.13 1：AI1 2：AI2 3：AI3(extension card) 4：high speed Pulse input 5： Communication setting Notes：1~4 100% relate to P03.13	0	
P03.13	Keypad setting torque	-300.0%~300.0%（motor rated current）	100.0%	
P03.14	Torque reference filter time	0.000s~10.000s	0.100s	
P03.15	Upper frequency source setup of forward rotation in vector control	0：Function P03.17 1：AI1 2：AI2 3：AI3(extension card) 4：high speed Pulse input 5： communication setting Notes：1~4 100% Relative to the maximum output frequency	0	
P03.16	Upper frequency of forward rotation in	0：Function code P03.18 1：AI1 2：AI2	0	

	vector control	3：AI3(extension card) 4：high speed Pulse input 5： communication setting Notes：1~4 100% Relative to the maximum output frequency		
P03.17	Keypad setting for upper frequency of forward rotation	0.00Hz~P00.07（the Max.output frequency）	50.00Hz	
P03.18	keypad setting for upper frequency of reverse rotation	0.00Hz~P00.07（the Max.output frequency）	50.00Hz	
P03.19	Upper electronic torque source	0：Function code P03.21 1：AI1 2：AI2 3：AI3(extension card) 4：HS pulse 5：communication setup Note： Setting mode 1-4 100%corresponds to three times of the motor current	0	
P03.20	Upper braking torque source	0：Function code:P03.22 1：AI1 2：AI2 3：AI3(extension card) 4：HS pulse 5：communication setup Note： Setting mode 1-4 100%corresponds to three times of the motor current	0	
P03.21	keypad setting of electronic torque	0.0%~300.0%（motor rated current ）	180.0%	
P03.22	keypad setting of e braking torque	0.0%~300.0%（motor rated current）	180.0%	
P03.23	Max voltage limit	0.0%~120.0%	100.0%	
P03.24	Pre-excitation time	0.000s~10.000s	0.300s	
P03.25	Constant coefficient of weak magnetic workarea	0.1~2.0	0.3	

P03.26	Constant coefficient min. weak flux point	10%~100%	20%	
P03.27	Vector control weal flux proportion gain	0~4000	1200	
P03.28	Low frequency torque compensation factor	0.0%~50.0%	0.0%	
P03.29	High frequency torque compensation factr	0.0%~50.0%	0.0%	
P03.30	Low frequency torque compensation cutoff frequency	0.00Hz~50.00Hz	5.00Hz	
P03.31	high frequency torque compensation cutoff frequency	0.00Hz~100.00Hz	50.00Hz	
P03.32	Speed-up/down torque compensation factor	0.000~10.000	0.000	
P03.33	Speed-up/down torque compensation upper limit	0.0%~50.0%	5.0%	
P03.34	Speed-up/down torque compensation lower limit	0.00Hz~50.00Hz	10.00Hz	
P04 Motor 1V/F control parameter group				
P04.00	Motor 1V/F curve setup	0： Straight line V/F curve 1： Multi-stage V/F curve 2：1.3#power low torque V/F curve 3：1.7#power low torque V/F curve 4：2.0#power low torque V/F curve 5：V/F complete separation 6：V/F half separation	0	
P04.02	Multi-stage V/F frequency point 1	0.00Hz~P04.04	0.00Hz	
P04.0	MS V/F voltage	0.0%~110.0%（motor 1 rated voltage）	0.0%	

3	point 1			
P04.04	MS V/F frequency point 2	P04.02~P04.06	0.00Hz	
P04.05	MS V/F voltage point 2	0.0%~110.0%（motor 1 rated voltage）	0.0%	
P04.06	MS V/F frequency point 3	P04.04~P00.07(max output frequency)	0.00Hz	
P04.07	MS V/F voltage point 3	0.0%~110.0%（motor 1 rated voltage）	0.0%	
P04.08	V/F slip compensation gain of motor 1	0.0%~200.0%	0.0%	
P04.09	V/F frequency Torque boost	0.0%： Torque boost 0.1%~10.0%	0.0%	
P04.10	Torque boost cutoff frequency	0.0%~50.0%（motor 1 rated voltage）	20.0%	
P04.11	Vibration control factor at low frequency of motor 1	0~100	10	
P04.12	Vibration control factor at high frequency of motor 1	0~100	10	
P04.13	Vibration control threshold of motor 1	0.00Hz~P00.07（The maximum frequency）	30.00Hz	
P04.14	Motor 1 Voltage setting	0：Function code P04.15 1：AI1 2：AI2 3：AI3 (extension card) 4: HS pulse input 5：PID control set up 6：Communication set up	0	
P04.15	Motor 1 Keypad setting voltage value	0.0%~100.0%	100.0%	
P04.16	Motor 1 voltage increasing time	0.0s~3600.0s	5.0s	
P04.17	Motor 1voltage decreasing time	0.0s~3600.0s	5.0s	
P04.18	Motor 1 maximum output voltage	P04.19~100.0%（Motor 1 rated voltage）	100.0%	

P04.19	Motor 1 minimum output voltage	0.0%~ P04.18 （the rated voltage of the motor）	0.0%	
P04.20	Motor 1 V/F control weak flux coefficient	1.00~1.30	1.00	
P04.21	Energy saving operation option of motor 1	0：Inactive 1：active	0	
GROUP P05 ： Input terminal Parameters GROUP				
P05.00	Terminal control running mode	0. Two-line mode 1 1. Two-line mode 2 2. Three-line mode 1 3. Three-line mode 2 4：alternative control	0	
P05.01	DI1 input terminal function selection	0: No function 1: Forward rotation (FWD) 2: Reverse rotation (REV) 3: Three-line mode running control 4: Forward rotation Jog (FJOG) 5: Reverse rotation Jog (RJOG) 6: random to stop 7: Pause 8: Fault reset (RESET) 9： External fault input 10: frequency setup increase(UP) 11: frequency setup decrease(UP) 12：frequency UP/DOWN setup clear 13 ： Frequency UP/DOWN setup clear temporary 14：Speed-up/Speed-down time selection 1 15：Speed-up/Speed-down time selection 1 16：MS speed terminal 1 17：MS speed terminal 2 18：MS speed terminal 3 19：MS speed terminal 4 20： Multi-step speed pause 21：DC brake instant 22：DC braking deceleration 23：External stop terminal 24：Emergency stop 25：PID control pause 26：PID effect direction reverse 27：PID parameter switch 28：pre-excitation command 29： Torque control disable	1	
P05.02	DI2 input terminal function selection		2	
P05.03	DI3 input terminal function selection		4	
P05.04	DI4 input terminal function selection		6	
P05.05	DI5 input terminal function selection		8	
P05.06	HDI1 input terminal function selection(can select HS pulse input)		0	
P05.07	DI7 input terminal Function selection(extension card)		0	
P05.08	DI8 input terminal Function selection(extension card)		0	
P05.09	DI9 input terminal function selection (extension card)			

		30：speed-up/down prohibit 31：Set A and set B switch 32：combined set and set A switch 33：combined set and set B switch 34：PLC stop reset 35：PLC pause 36：Counter trigger 37：Counter reset 38： reserved 39： reserved 40 ： Running command switching to operation panel 41：Running command switching to terminal 42 ： Running command switching to communication 43： consumption power clear 44： consumption power holding 45：Swing frequency pause(stop at present frequency) 46：Swing frequency reset(back to centre frequency) 47： motor switch 48： Clean up present running time 49：User-defined fault type 1 50：User defined fault type2 51：User defined fault type3 52：User defined fault type4 53~63：Reserved		
P05.10	HDI1 terminal function selection	0： HS pulse input 1：Switch input	0	
P05.11	Digit input polarity selection	0x000~0x1FF: bit0~bit8 responding with DI1~DI5,DHI1, DI7~DI9 binary digit set value function: 0: switch close effect 1: switch open effect	0x000	
P05.12	DI filter time	0.000s~1.000s	0.010s	
P05.13	AI1 minimum voltage input	-10.00V~P05.15	0.00V	
P05.14	AI1 minimum voltage Corresponding setup	-100.0%~100.0%	0.0%	

P05.15	AI1 voltage upper limit	P05.13~10.00V	10.00V	
P05.16	AI1 upper limit voltage Corresponding setup	-100.0%~100.0%	100.0%	
P05.17	AI1 input filter time	0.000s~10.000s	0.100s	
P05.18	AI2 input type	0：voltage input 1：current input	0	
P05.19	AI2 voltage lower limit	-10.00V~P05.21	0.00V	
P05.20	AI2 voltage lower limit Corresponding setup	-100.0%~100.0%	0.0%	
P05.21	AI2 voltage upper limit	P05.19~10.00V	10.00V	
P05.22	AI2 voltage upper limit Corresponding setup	-100.0%~100.0%	100.0%	
P05.23	AI2 current lower limit	-20.00mA~P05.25	0.00mA	
P05.24	AI2 current lower limit Corresponding setup	-100.0%~100.0%	0.0%	
P05.25	AI2 current upper limit	P05.23~20.00mA	20.00mA	
P05.26	AI2 current upper limit Corresponding setup	-100.0%~100.0%	100.0%	
P05.27	AI2 input filter time	0.000s~10.000s	0.100s	
P05.28	AI3 input type selection	0：voltage input 1：current input	0	
P05.29	AI3 voltage lower limit	-10.00V~P05.31	0.00V	
P05.30	AI3 voltage lower limit Corresponding setup	-100.0%~100.0%	0.0%	
P05.3	AI3 voltage upper	P05.29~10.00V	10.00V	

1	limit			
P05.32	AI3 voltage upper limit Corresponding setup	-100.0%~100.0%	100.0%	
P05.33	AI3 current lower limit	-20.00mA~P05.35	0.00mA	
P05.34	AI3 current lower limit Corresponding Setup	-100.0%~100.0%	0.0%	
P05.35	AI3 current upper limit	P05.33~20.00mA	20.00mA	
P05.36	AI3 current upper limit Corresponding setup	-100.0%~100.0%	100.0%	
P05.37	AI3 input filter time	0.000s~10.000s	0.100s	
P05.38	Reserved			
P05.39	HS(pulse) input minimum frequency	0.00kHz~P05.41	0.00kHz	
P05.40	HS(pulse) input minimum Frequency corresponding setup	-100.0%~100.0%	0.0%	
P05.41	HS (pulse) input Maximum frequency	P05.39~100.00kHz	50.00kHz	
P05.42	HS (pulse) input Maximum frequency Corresponding setup	-100.0%~100.0%	100.0%	
P05.43	HS (pulse) input filter time	0.000s~10.000s	0.000s	
P05.44	DI1 terminals close delay time	0.0s~6000.0s	0.0s	
P05.45	DI1 terminals open delay time	0.0s~6000.0s	0.0s	
P05.46	DI2 terminals close delay time	0.0s~6000.0s	0.0s	

P05.47	DI2 terminals open delay time	0.0s~6000.0s	0.0s	
P05.48	DI3 terminals close delay time	0.0s~6000.0s	0.0s	
P05.49	DI3 terminals open delay time	0.0s~6000.0s	0.0s	
P05.50	DI4 terminals close delay time	0.0s~6000.0s	0.0s	
P05.51	DI4 terminals open delay time	0.0s~6000.0s	0.0s	
P05.52	DI5 terminals close delay time	0.0s~6000.0s	0.0s	
P05.53	DI5 terminals open delay time	0.0s~6000.0s	0.0s	
P05.54	HDI1 terminals close delay time	0.0s~6000.0s	0.0s	
P05.55	HDI1 terminals open delay time	0.0s~6000.0s	0.0s	
P05.56	DI7 terminals close delay time	0.0s~6000.0s	0.0s	
P05.57	DI7 terminals open delay time	0.0s~6000.0s	0.0s	
P05.58	DI8 terminals close delay time	0.0s~6000.0s	0.0s	
P05.59	DI8 terminals open delay time	0.0s~6000.0s	0.0s	
P05.60	DI9 terminals close delay time	0.0s~6000.0s	0.0s	
P05.61	DI9 terminals open delay time	0.0s~6000.0s	0.0s	
P06 output terminal function parameter group				
P06.00	HDO1 output terminals mode selection	0：HS Pulse output 1：Switch output	0	
P06.02	Digital output valid logic option	0x00~0x1F: bit0~bit3 correspond to DO1 HDO1 T1 T2 DO5, binary bit set value function 0：Switch close 1: switch open	0x00	
P06.03	DO1 digit output selection	0：No output 1：Inverter is running 2：Run forward 3：Run reverse 4： Jogging operation 5：inverter Fault	0	
P06.04	HDO1 Digital output mode function		0	
P06.0	relay T1 digit		0	

5	output selection	6： Pre-excitation 7：Ready for running 8：overload pre-warning 9：Loading off warning 10：Frequency level detection FDT1 output 11：Frequency level detection FDT2 output 12： zero speed running 13： Frequency arrival 14：Frequency upper limit arrival 15：Frequency lower limit arrival 16：Setup counting value arrival 17：Designated counting value arrival 18： complete of simple PLC stage 19：PLC circulation completion 20： External fault valid 21： accumulate running time arrival 22：accumulate power-on time arrival 23: present running time arrival 24: present power-on time arrival 25：random frequency arrival 26：random current arrival 27：Current overload 28：communication virtual terminal output 29: brake control 30: stop command output 31： Running (non-jog running)		
P06.06	Relay T2 output selection		0	
P06.07	DO5 function select ion of output terminals (extension card)		0	
P06.08	AO1 analog output selection	0 ： Running frequency （100.0%Corresponding the maximum output frequency ） 1 ： Setup frequency （100.0%Corresponding the maximum output frequency ） 2：Output current 1（100.0% Corresponding 2 times of motor rated current） 3: Output voltage 1 (100.0% Corresponding 1.5imes of inverter rated voltage） 4: motor speed(100.0% Corresponding 2 times of motor rated speed) 5：Output power（（100.0%Corresponding 2 times of motor rated power） 6： HS HDI input value 7：AI1 input value） 8：AI2 input value	0	
P06.09	AO2 output selection		0	
P06.10	HDO1 pulse output functions		0	

		9：Reserved 10：Reserved 11：Counting value 12：Output torque(100.0% corresponding 2times of motor rated torque) 13：Output current 2（0.0A~1000.0A） 14：Output voltage 2（0.0V~1000.0V） 15：slop setting frequency（100.0% corresponding max output frequency） 16： communication set value 1 17： communication set value 18~25：Reserved		
P06.11	AO1 voltage (current) output lower limit	0.00V~P06.13（0.00mA~P06.13）	0.00V	
P06.12	AO1 voltage(current) output lower limit Corresponding setup	0.0%~100.0%	0.0%	
P06.13	AO1 voltage(current)output Upper limit	P06.11~10.00V（P06.11~20.00 mA）	10.00V	
P06.14	AO1 voltage(current)output Upper limit Corresponding setup	0.0%~100.0%	100.0%	
P06.15	AO1 output filter time	0.000s~10.000s	0.000s	
P06.16	AO2 voltage (current) output lower limit	0.00V~P06.18（0.00mA~P06.18）	0.00V	
P06.17	AO2 voltage(current) output lower limit Corresponding setup	00.0%~100.0%	0.0%	
P06.18	AO2 voltage(current) output upper limit	P06.16~10.00V（P06.16~20.00 MA）	10.00V	
P06.19	AO2 voltage(current)o	0.0%~100.0%	100.0%	

	utput Upper limit Corresponding setup			
P06.20	AO2 output filter time	0.000s~10.000s	0.000s	
P06.21	HDO1 output lower limit	0.0%~P06.23	0.0%	
P06.22	lower limit corresponding HD01 output	0.00kHz~100.00kHz	0.0kHz	
P06.23	HDO1 output upper limit	P06.21~100.0%	100.0%	
P06.24	Upper limit corresponding HDO1 output	0.00kHz~100.00kHz	50.00kHz	
P06.25	HDO1 output filter time	0.000s~10.000s	0.000s	
P06.26	Close delay of DO1 terminals	0.0s~6000.0s	0.0s	
P06.27	Open delay of DO1 terminals	0.0s~6000.0s	0.0s	
P06.28	Close delay of HDO1 terminals	0.0s~6000.0s	0.0s	
P06.29	Open delay of HDO2 terminals	0.0s~6000.0s	0.0s	
P06.30	Close delay of relay T1	0.0s~6000.0s	0.0s	
P06.31	Open delay of relay T1	0.0s~6000.0s	0.0s	
P06.32	Close delay of relay T2	0.0s~6000.0s	0.0s	
P06.33	Open delay of relay T2	0.0s~6000.0s	0.0s	
P06.34	close delay of D05 terminals	0.0s~6000.0s	0.0s	
P06.35	Open delay of D05 terminals	0.0s~6000.0s	0.0s	
GROUP P08 ： Process PID Control Parameters GROUP				
P08.00	PID command source	0：P08.01 function code 1：AI1 2：AI2 3：AI3(extension card)	0	

		4：HS PULSE setup 5：MS speed command 6：Communication setup 7：Keypad potentiometer		
P08.01	PID command setup	0.0%~100.0%	50.0%	
P08.02	PID command UP/DOWN time	0.00s~100.00s	0.00S	
P08.03	PID feedback source	0：AI1 1：AI2 2：AI3(extension card) 3：AI1-AI2 4：AI1+AI2 5：MAX(AI1，AI2) 6：MIN(AI1，AI2) 7：HS Pulse input setup 8：Communication setup	0	
P08.04	PID output feature selection	0: PID output Positive feature 1: PID output negative feature	0	
P08.05	PID feedback display factor	0.00~655.35（Users define	1.00	
P08.06	Proportional gain P 1	0.00~100.00	1.00	
P08.07	Integration time I 1	0.01s~10.00s	0.10s	
P08.08	Differential time D 1	0.00s~10.00s	0.00s	
P08.09	Proportional gain 2	0.00~100.00	1.00	
P08.10	Integration time 2	0.01s~10.00s	0.10s	
P08.11	Differential time 2	0.00s~10.00s	0.00s	
P08.12	PID parameter switch conditions	0：No switch(only use PID parameter 1) 1：DI terminals 2: according to deviation auto-switch	0	
P08.13	PID parameter switch Deviation 1	0.0%~100.0%	20.0%	
P08.14	PID parameter switch Deviation 2	0.0%~100.0%	80.0%	
P08.15	PID Deviation limit	0.0%~100.0%	0.0%	
P08.1	PID pre-output	0：No pre-output mode	0	

6	mode	1: according to retention time output 2: output when PID feedback< switch valve value 3: output when PID feedback> switch valve value		
P08.17	PID pre-output value	0.0%~100.0% (as frequency command relative to max output frequency P00.07)	10.0%	
P08.18	PID pre-output value retention timing	0.00s~600.00s	0.50s	
P08.19	PID pre-output switch valve value	0.0%~100.0% (relative to PID command value)	50.0%	
P08.20	Feedback lost detecting value	0.0%：No check 0.1%~100.0%	0.0%	
P08.21	Feedback lost detecting Time	0.0s~20.0s	0.0s	
P08.22	Feedback overlimit detect value	0.0%：No check 0.1%~100.0%	0.0%	
P08.23	Feedback overlimit detection time	0.0s~20.0s	0.0s	
P08.24	PID dormant threshold	P08.25~100.0%（PID feedback） 100%：Cancel the sleep function	100.0%	
P08.25	PID revive threshold	0.0%~ P08.24（PID feedback）	0.0%	
P08.26	PID dormant waiting time	0.0s~6000.0s	1.0s	
P08.27	PID revive waiting time	0.0s~6000.0s	0.5s	
P08.28	PID calculation mode	0：Stop No calculation 1：Stop calculation	0	
P08.29	PID output positive Max value	0.0%~100.0%	100.0%	
P08.30	PID output reverse Max value	0.0%~100.0%	0.0%	
P08.31	PID feedforward source selection	0: no feedforward 1: AI1 2: AI2 3: AI3(extension card) 4: HS pulse	0	

		5: communication		
P08.32	PID feedforward gain	0.00~60.00	1.00	
P08.33	PID output positive maximum change value	0.0%：No limited 0.1%~100.0%	0.0%	
P08.34	PID output reverse maximum change value	0.0%：No limited 0.1%~100.0%	0.0%	
P08.35	PID sampling period	0.000s~100.000s	0.100s	
P08.36	PID adjust option	0：Continue integration arriving upper and lower limit 1：Stop integration arriving upper and lower limits	1	
GROUP P09 ： Special Function Parameters GROUP				
P09.00	Jog running frequency	0.00Hz~P00.07 (max output frequency)	5.00Hz	
P09.01	Jog running speed-up time	0.0s~3600.0s	Model dependent	
P09.02	Jog running speed down time	0.0s~3600.0s	Model Dependent	
P09.03	Speed-up Time 1	0.0s~3600.0s	Model Dependent	
P09.04	Speed-down time1	0.0s~3600.0s	Model Dependent	
P09.05	Speed-up time 2	0.0s~3600.0s	Model Dependent	
P09.06	Speed-down Time2	0.0s~3600.0s	Model Dependent	
P09.07	Speed-up time 3	0.0s~3600.0s	Model Dependent	
P09.08	Speed-down time3	0.0s~3600.0s	Model dependent	
P09.09	Set frequency arriving detection range	0.00Hz~P00.07 （ maximum output frequency）	0.00Hz	
P09.10	Frequency detection Value 1 (FDT1)	0.00Hz~P00.07 （ maximum output frequency）	50.00Hz	
P09.11	Frequency detection Hysteresis	0.0%~100.0%（relative to FDT1）	5.0%	

	value(FDT1 hysteresis)			
P09.12	Frequency detection Value 1 (FDT2 level)	0.00Hz~P00.07 （ maximum output frequency）	50.00Hz	
P09.13	Frequency detection Hysteresis value (FDT2 hysteresis)	-100.0%~100.0%（relative to FDT2）	5.0%	
P09.14	Swing setup mode	0: central frequency 1：Maximum frequency（Reserved）	0	
P09.15	Swing frequency amplitude	0.0%：close Swing function 0.1%~100.0%	0.0%	
P09.16	Jump frequency amplitude	0.0%~50.0%	0.0%	
P09.17	Swing frequency boost time	0.0s~3000.0s	5.0s	
P09.18	Swing Frequency decrease time	0.0s~3000.0s	5.0s	
P09.19	Jumping frequency 1	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P09.20	Jumping frequency Range 1	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P09.21	Jumping frequency 2	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P09.22	Jumping frequency range 2	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P09.23	Jumping frequency range 3	0.00Hz~P00.07(max output frequency)	0.00Hz	
P09.24	Jumping frequency range 3	0.00Hz~P00.07(max output frequency)	0.00Hz	
P09.25	Reserved			
P09.26	Reserved			
P09.27	Setup counting value	P09.28~65535	1000	
P09.2	Designated	1~P09.27	500	

8	counting value			
P09.29	Droop control frequency drop rate	0.00Hz~10.00Hz	0.00Hz	
P09.30	Accumulate running arrival time set	0h~65535h	0h	
P09.31	Accumulate power-on arrival time set	0h~65535h	0h	
P09.32	Present running arrive time set	0min~65535min	0min	
P09.33	Present power-on arrive time set	0min~65535min	0min	
P09.34	Random arrival frequency	0.00Hz~P00.07 (max output frequency)	0.00	
P09.35	Random arrival frequency detecting amplitude	0.00Hz~P09.34	0.00	
P09.36	Random Arrival current	0.0%~300.0%	0.0%	
P09.37	Random Arrival current detecting amplitude	0.0%~P09.36	0.0%	
P09.38	Electricity consumption initial value high bit	0 kwh~60000kwh	0kwh	
P09.39	Electricity consumption initial value low bit	0 wh~999.9wh	0.0wh	
P09.40	Inverter input power factor	0.00~1.0	0.86	
P09.41	JOG/REV quick frequency setup & keypad ^/v fine tuning frequency	0x0000~0x1221 LED the unit bit: frequency control selection 0： adjusting valid 1： keypad adjusting invalid LED the decade bit: frequency control selection 0: only P00.02=1 or P00.03=1 valid 1: all frequency mode are valid 2: MS speed in priority, invalid for MS speed	0x0000	

		LED the hundred: stop action selection 0: setup valid 1: valid in running, clear after stop 2: valid in running, clear upon receiving stop command LED the thousand" ^/v key integration function 0: integration function valid 1: integration function invalid		
P09.42	^/v key integration ratio	0.01s~10.0s	1.0s	
P09.43	UP/DOWN terminals Control set	0x000~0x221 LED the unit bit： frequency control selection 0：UP/DOWN terminals setting valid 1：UP/DOWN terminals setting invalid LED the decade： Frequency control selection 0： only valid when P00.02=1or P00.03=1 1： all frequency mode are valid 2： when the multi-step speed are priority,it is invalid to the multi-step speed LED the hundreds: action selection when stop 0： setting valid 1： valid in the running ,clear after stop 2： Valid in the running ,clear upon receiving stop command	0x000	
P09.44	UP/DOWN terminals Change ratio	0.01Hz/s ~50.0Hz/s	1.00Hz/s	
P09.45	Frequency setting at power loss action selection	0x000~0x111 LED the unit bit: action selection when digital adjusting frequency with power off 0： save when power off 1： clear when power off LED the decade： action selection when Modbus setting frequency power off MODBUS set frequency off 0： save when power off 1： clear when power off LED the hundred: action selection when other Communication setting frequency power off	0x000	

		0: save when power off 1: clear when power off		
P09.46	PWM selection	0x00~0x21 LED the unit bit： PWM mode selection 0: PWM mode 1, PWM mode1, 3phase modulation and 2phase -modulation 1： PWM mode2, three phase modulation LED the decade: PWM low speed carrier limit 0: low speed carrier limit, carrier limit mode 1 1: low speed carrier limit, carrier limit mode 2 2: low speed carrier no-limit	0x01	
P09.47	Zero frequency output option	0： No voltage output 1：Voltage output 2：DC brake current output at stop	0	
P09.48	Action if Accumulate power-on and running time arrival	0： Output terminals action ，Error alarm 1： Output terminals action, no error alarm	0	
P09.49	Motor power correction factor	0.00%~200.0%	100.0%	
P09.50	User define fault choice	0：Forbid running when error occurred 1：Jogging running when error occurred	0	
P09.51	Brake release frequency	0.00Hz~P00.07 (max output frequency)	0.00Hz	
P09.52	Brake release current	0.0%~200.0% (100% correspond with motor rate current)	0.0%	
P09.53	Brake-on frequency	0.00Hz~P00.07(max output frequency)	0.00Hz	
P09.54	Brake-on current	0.0%~200.0% (100% correspond with motor rate current)	0.0%	
GROUP P10 ： Keyboard and Display Parameters GROUP				
P10.00	STOP/RESET Key stop function	0：Active only in the keyboard control mode 1：Active both in the keyboard and terminals control mode 2 ： Active both in the keyboard and communication control mode 3：valid all the control mode	0	
P10.01	REV/JOG key-press	0：No Function 1：Jog running	1	

	function	2：FDW/REV switching 3：random stop 4 ： Clear UP/DOWN & ^/v key setup frequency 5： Shift key switch display state 6： realize running command pre-set mode according to sequence switch 7 ： quick debugging mode(accord to manufacturer parameter) 8: quick revise setting frequency		
P10.02	JOG/REV key Running command Channel switch sequency selection	0： keyboard control←→terminal control 1 ： Keyboard control --communication control 2 ： terminal control ←→communication control 3：keyboard control →terminals control→communication control	3	
P10.03	Running display parameter low bit	0x0000~0xFFFF BIT0： running frequency (Hz light on) BIT1： setting frequency(Hz flash) BIT2：（V light on）bus voltage BIT3： output voltage(V light on) BIT4： output current(A light on) BIT5：（RPM on）running speed BIT6： output power(% light on) BIT7： output torque (% light on) BIT8：PID pre-set value (% flash） BIT9： PID Feedback value(% light on) BIT10： state of input terminals BIT11： state of output terminals BIT12： torque set value (% light on) BIT13： pulse counter value BIT14 ： PLC current stage in multi step-speed BIT15：slope frequency pre-set value(Hz light on)	0x003F	
P10.04	operation Display parameter high bit	0x0000~0xFFFF BIT0： analog AI1 value（V on） BIT1：analog AI2 value（V on） BIT2：analog AI3 value(extension card) (V light on) BIT3：HS pulse HDI frequency BIT4： motor overload percentage(% light on) BIT5：inverter overload percentage(% light	0x0000	

		on) BIT6： linear speed BIT7： excitation current （A on） BIT8：Torque current （A on） BIT9：AC input current (A on) BIT10~BIT15： reserved		
P10.05	stop Display parameter	0x0000~0xFFFF BIT0：set frequency（Hz flash） BIT1：bus voltage（Von） BIT2：state of input terminals BIT3： state of output terminals BIT4： PID setting value（% flash） BIT5： PID Feedback value(% on) BIT6： Torque set value（% on） BIT7： analog AI1（Von） BIT8：analog AI2（Von） BIT9：analog AI3 (extension card)（V on） BIT10： high speed HDI pulse frequency BIT11： PLC present stage of multi stage speed BIT12：pulse count value BIT13~BIT15:Reserved	0x0003	
P10.06	Frequency display coefficient	0.00~60.00 Display frequency=running frequency*P10.06	1.00	
P10.07	RPM speed display coefficient	0.00~60.00 Load RPM= RPM*P10.07	1.00	
P10.08	Linear speed display coefficient	0.00~60.00 Linear speed=mechanic RPM*P10.08	1.00	
GROUP P11 ： MS speed and PLC Parameters GROUP				
P11.00	MS speed 0	-100.0%~100.0%	0.0%	
P11.01	MS speed 1	-100.0%~100.0%	0.0%	
P11.02	MS speed 2	-100.0%~100.0%	0.0%	
P11.03	MS speed 3	-100.0%~100.0%	0.0%	
P11.04	MS speed 4	-100.0%~100.0%	0.0%	
P11.05	MS speed 5	-100.0%~100.0%	0.0%	
P11.06	MS speed 6	-100.0%~100.0%	0.0%	

P11.07	MS speed 7	-100.0%~100.0%	0.0%	
P11.08	MS speed 8	-100.0%~100.0%	0.0%	
P11.09	MS speed 9	-100.0%~100.0%	0.0%	
P11.10	MS speed 10	-100.0%~100.0%	0.0%	
P11.11	MS speed 11	-100.0%~100.0%	0.0%	
P11.12	MS speed 12	-100.0%~100.0%	0.0%	
P11.13	MS speed 13	-100.0%~100.0%	0.0%	
P11.14	MS speed 14	-100.0%~100.0%	0.0%	
P11.15	MS speed 15	-100.0%~100.0%	0.0%	
P11.16	PLC	0: Stop after running 1 time 1:Keep final value after running 1 time 2: cycle running	0	
P11.17	PLC restart mode selection	0: restart from the 1 stage 1: restart from the stage where break off	0	
P11.18	Simple PLC memory	0： Power lost memory 1： Power lost no memory	0	
P11.19	MS time unit setup	0：s 1：h	0	
P11.20	Zero-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.21	Speed-up/speed-down time selection of zero-stage	0~3	0	
P11.22	The 1-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.23	The 1st-stage speed-up/ speed-down time selection	0~3	0	
P11.24	The 2nd-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.25	The 2nd-stage speed-up/speed-down time selection	0~3	0	

P11.26	The 3rd-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.27	The 3rd-stage speed-up/ speed-down time selection	0~3	0	
P11.28	The 4th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.29	The 4th-stage speed-up/speed-down time selection	0~3	0	
P11.30	The 5th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.31	The 5th-stage speed-up/speed-down time selection	0~3	0	
P11.32	The 6th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.33	The 6th-stage speed-up/speed-down time selection	0~3	0	
P11.34	The 7th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.35	The 7th-stage speed-up/speed-down time selection	0~3	0	
P11.36	The 8th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.37	The 8th-stage speed-up/speed-down time selection	0~3	0	
P11.38	The 9th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.39	The 9th-stage speed-up/ speed-down time selection	0~3	0	
P11.40	The 10th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.4	The 10th-stage	0~3	0	

1	speed-up/ speed-down time selection			
P11.42	The 11st-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.43	The 11st-stage speed-up/speed-down time selection	0~3	0	
P11.44	The 12th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.45	The 12th-stage speed-up/speed-down time selection	0~3	0	
P11.46	The 13rd-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.47	The 13rd-stage speed-up/speed-down time selection	0~3	0	
P11.48	The 14th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.49	The 14th-stage speed-up/speed-down time selection	0~3	0	
P11.50	The 15th-stage time	0.0s（h）~6000.0s（h）	0.0s	
P11.51	The 15th-stage speed-up/speed-down time selection	0~3	0	
P12 Reserved				
GROUP P13 ： Protection Parameters GROUP				
P13.00	Motor1 overload protection selection	0： No protect 1 ： general Motor(with low speed compensation) 2：variable frequency motor (no low speed compensation)	2	
P13.01	Motor1 overload Protection coefficient	20.0%~200.0%	100.0%	
P13.02	Motor2 overload protection	0： No protect 1 ： general Motor(with low speed	2	

	selection	compensation) 2：various frequency inverter(no low speed compensation)		
P13.03	Motor2 overload protection coefficient	20.0%~200.0%	100.0%	
P13.04	Inverter or motor overload pre-alarm detection	50%~200%	G：150%	
			P：120%	
P13.05	Inverter or motor overload pre-alarm of detection time	0.0s~3600.0s	1.0s	
P13.06	Inverter or motor offload pre-alarm detection	0%~P13.04	50%	
P13.07	Inverter or motor offload pre-alarm of detection time	0.0s~3600.0s	1.0s	
P13.08	Inverter or motor overload/offload pre-alarm selection	0x000~0x131 LED the unit bit： 0 ： offload/overload pre-alarm of the motor,relative to the rated current of the motor 1 ： offload/overload pre-alarm of the inverter,relative to the rated current of the inverter LED the decade： 0 ： the inverter continues to work after alarm on overload/offload 1 ： the inverter continues to work after offload alarm stops to run after overload alarm 2: the inverter continues to work after overload alarm stops to run after offload alarm 3: inverter stops after offload/overload alarm LED the HUNDREDS： 0： Detection all the time 1： Detection in constant speed running	0x000	
P13.09	detecting value of output current	0.0%：No check 0.1%~300.0%	0.0%	

	over limit			
P13.10	Overlimit detecting time of output current	0.0s~100.0s	0.0s	
P13.11	Output current overlimit action	0：terminal output 1：terminal output ,Er016 alarm 2：terminal output ， alarm Er016 when constant speed running	0	
P13.12	overvoltage speed lost protection	0： valid 1： enable	1	
P13.13	voltage protection of overvoltage stall	120%~150%（standard bus voltage, 380V）	140%	
		120%~150%（standard bus voltage）(220V)	120%	
P13.14	Energy consumption brake	0： disable 1：enable	1	
P13.15	Energy consumption brake voltage	200.0V~2000.0V (1. 220VAC corresonding：380.0VDC) (2. 380VAC corresonding：700.0VDC)		
P13.16	Current limit selection	0x00~0x11 LED the unit： current limit action selection 0： invalid current limit action 1： valid for current limit action LED the decade：overload alarm selection of hardware current limit 0：hardware current limit overload alarm valid 1：hardware current limit overload alarm invalid	0x01	
P13.17	Automatic current limit Level	50.0%~200.0%	G mode：160.0%	
			P mode：120.0%	
P13.18	Frequency decreasing ratio while current limiting	0.00Hz/s ~50.00Hz/s	10.00Hz/s	
P13.19	phase loss protection	0x00~0x11 LED the unit bit: 0： input phase loss protection disable 1： input phase loss protection enable LED the decade: 0： output phase loss protection disable 1： output phase loss protection enable	Model dependent	

P13.20	function selection at sudden power loss frequency decreasing	0： disable 1： enable	0	
P13.21	speed decreasing time with sudden power loss	0.0s~3600.0s	10.0s	
P13.22	Sudden power loss judging voltage	200.0VDC~600.0VDC	380VAC corresponding: 420.0VDC	
			220VAC corresponding: 240.0VDC	
P13.25	Power-on to ground short circuit protection selection	0: valid 1: invalid	0	
P13.26	Fault output terminals action selection at fault	0x00~0x11 LED the unit bit: 0: action upon under-voltage error 1: no action upon under-voltage error LED the decade: 0: action during auto reset 1: no action during auto reset	0x00	
P13.27	Fault auto reset time	0~20	0	
P13.28	interval time of automatic fault reset	0.1s~3600.0s	1.0s	
P13.29	Fan startup mode	0： Automatic control 1：Fan keep running	0	
GROUP P14 ： Fault Record Parameters GROUP				
P14.00	Fault record selection	0~3 (0：current fault，1：Last fault，ID is more bigger, the earliest fault)	0	
P14.01	Fault code	0： No fault Er001： Speed-up running over current (hardware) Er002：Speed-down running over current (hardware) Er003 ： Constant speed running over current (hardware) Er004： Speed-up running over current (software) Er005 ： Speed-down running over	0	

		current(software) Er006 ： Constant speed running over current(software) Er007： Speed-up running overvoltage Er008：Speed-down running overvoltage Er009：Constant speed running overvoltage Er010： Bus under voltage Er011： Motor overload Er012： The inverter overload Er013： Input side phase loss Er014： Output side phase loss Er015：Overheat of the inverter module Er016： Current overlimit fault Er017： External fault Er018： communication error Er019： current detection circuit error Er020：motor self-learning error Er021：EEPROM read-write error Er022：PID feedback overlimit error Er023：PID feedback lost error Er024：motor to ground short circuit Er025：Reserved Er026： Reserved Er027：Running time arrival Er028：power-on time arrival Er029：offload Er030： Reserved Er031： Reserved Er032： Reserved Er033： Reserved Er034： Overheat Er035： Reserved Er036： Electronic overload Er037~ Er040：Reserved Er041：User-defined failure 1 Er042：User-defined failure2 Er043：User-defined failure 3 Er044：User-defined failure 4 Er045~ Er059：Reserved Er060：User-defined failure 1 Er061：User-defined failure 2		
P14.02	Running frequency upon fault	0.00Hz~650.00Hz	0.00Hz	
P14.0	Current upon fault	0.0A~2000.0A	0.0A	

3				
P14.04	output voltage at fault	0V~2000V	0V	
P14.05	Bus voltage upon fault	0.0V~2000.0V	0.0V	
P14.06	input terminal status upon fault	0x000~0x1FF	0x000	
P14.07	Output terminal status upon fault	0x00~0x1F	0x00	
P14.08	inverter temperate at fault	-20.0°C~120.0°C	0.0°C	
P14.09	Running time at fault	0min~65535min	0min	
P14.10	Power-on time at fault	0min~65535min	0min	
P14.11	Accumulate running time at fault	0h~65535h	0h	
P14.12	Accumulate power-on time at fault	0h~65535h	0h	
GROUP P15: Modbus Communication Parameter GROUP				
P15.00	Communication type selection	0：Modbus	0	
P15.01	IP address	0：broadcast address 1~247：Slave address	1	
P15.02	Baud rate	0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps 6：57600bps 7：115200bps	3	
P15.03	Data format	0：No verify（N，8，1），for RTU 1：Even verify（E，8，1）, for RTU 2：Odd verify（O，8，1），for RTU 3：No verify（N，8，2），for RTU 4：Even verify（E，8，2），for RTU 5：Odd verify（O，8，2），for RTU	0	
P15.04	response delay	0ms~200ms	5ms	
P15.0	Communication	0.0s： No detect	0.0s	

5	overtime detect time	0.1s~100.0s		
P15.06	Communication overtime error disposal	0： Alarm and stop freely 1： No alarm and continue to run 2：No alarm and stop according to the stop mode(only under the communication control) 3：No alarm and stop according to the stop mode (under all control modes)	0	
P15.07	Communication Processing action selection	0x00~0x11 LED the unit bit: 0： Write with responds 1： Write without responds LED the decade: 0： Communication encrypting no limit 1： Communication encrypting with limit	0x00	
Group P20 ：Motor 2 Parameters Group				
P20.00	Motor 2 type selection	0： Asynchronous motor	0	
P20.01	Motor 2 rated power	0.4kW~1000.0kW	Model dependent	
P20.02	Motor 2 rated voltage	0V~1500V	Model Dependent	
P20.03	Motor 2 rated current	0.0A~2000.0A	Model Dependent	
P20.04	Motor 2 rated frequency	0.00Hz~650.00Hz	Model Dependent	
P20.05	Motor 2 rated rotation speed	0RPM~65535RPM	Model dependent	
P20.06	Motor 2 stator resistance	0.000Ω~65.535Ω	Model dependent	
P20.07	Motor 2 rotor resistance	0.000Ω~65.535Ω	Model dependent	
P20.08	Motor 2 stator/rotator leakage inductance	0.0mH~6553.5mH	Model dependent	
P20.09	Motor 2 stator/rotator mutual Inductance	0.0mH~6553.5mH	Model dependent	
P20.10	Motor 2 no-load current	0.0A~P20.03(motor 2 rate current)	Model dependent	

P21 Motor 2 V/F control Group				
P21.00	Motor 2 V/F curve setting	0： Straight line V/F curve 1： Multi-stage V/F curve 2：1.3#power lower torque V/F curve 3：1.7# power lower torque V/F curve 4：2.0# power lower torque V/F curve 5: V/F complete separation 6: V/F half separation	0	
P21.02	Frequency point 1of Motor 2 V/F	0.00Hz~P21.04	0.00Hz	
P21.03	Motor 2V/F voltage point 1	0.0%~110.0% (rated voltage of motor 2	0.0%	
P21.04	Motor2 V/F frequency point 2	P21.02~ P21.06	0.00Hz	
P21.05	Motor 2 V/F voltage point 2	0.0%~110.0% (motor 2 rate voltage)	0.0%	
P21.06	Motor 2V/F frequency point 3	P21.04~ P00.07	0.00Hz	
P21.07	Motor 2 V/F voltage point 3	0.0%~110.0% (motor 2 rate voltage)	0.0%	
P21.08	Motor 2 V/F slip compensation gain	0.0%~200.0%	100.0%	
P21.09	Torque boost of motor 2	0.0%: auto torque boost 0.1%~10.0%	0.0%	
P21.10	Torque boost cut off of motor 2	0.0%~50.0% (relate to motor 2 rate frequency)	20.0%	
P21.11	Low frequency suppression vibrate factor of motor 2	0~100	10	
P21.12	high frequency suppression vibrate factor of motor 2	0~100	10	
P21.13	vibration suppression threshold of motor 2	0.00Hz~P00.07（Maximum frequency）	30.00Hz	
P21.14	Voltage setting channel selection of motor 2	0：function code P21.15 1：AI1 2：AI2 3：AI3(extension card) 4：HS Pulse input	0	

		5：PID control setup 6：communication setup		
P21.15	Keypad setting voltage value of motor 2	0.0%~100.0%	100.0%	
P21.16	Voltage increasing time of motor 2	0.0s~3600.0s	5.0s	
P21.17	Voltage decreasing time of motor 2	0.0s~3600.0s	5.0s	
P21.18	Maximum output voltage of motor 2	P21.19~100.0%（Rated voltage of motor）	100.0%	
P21.19	Minimum output voltage of motor 2	0.0%~P21.18 （Rated voltage of motor）	0.0%	
P21.20	Motor 2 v/f controlling Weak flux coefficient	1.00~1.30	1.00	
P21.21	Energy-saving operation of motor 2	0：Invalid 1：valid	0	
GROUP P28: Condition monitoring Parameters GROUP				
P28.00	Running frequency		0.01Hz	
P28.01	Setup frequency		0.01Hz	
P28.02	Slope pre-set frequency		0.01Hz	
P28.03	Bus voltage		0.1V	
P28.04	Output voltage		1V	
P28.05	Output current		0.1A	
P28.06	Torque current		0.1A	
P28.07	Exciting current		0.1A	
P28.08	Output power percentage		0.1%	
P28.09	Output torque		0.1Nm	
P28.10	Output torque percentage		0.1%	
P28.11	Setup torque percentage		0.1%	
P28.12	Motor running speed		1RPM	
P28.13	Speed controller output		0.0%	
P28.14	Input Condition		1	

	of DI			
P28.15	Input Condition of DO		1	
P28.16	AI1 voltage		0.01V	
P28.17	AI2 voltage		0.01V	
P28.18	AI3 voltage(extension card)		0.01V	
P28.19	Counting value		1	
P28.20	Motor power value		0.01	
P28.21	Magnetic flux linkage		0.1%	
P28.22	PID setting value		0.01	
P28.23	PID feedback value		0.01	
P28.24	PID output value		0.1%	
P28.25	PLC stage		1	
P28.26	HS Pulse input frequency		0.01kHz	
P28.27	Linear speed		1	
P28.28	Accumulate running time		1h	
P28.29	Accumulate power-on time		1h	
P28.30	Present running time		1min	
P28.31	Present power-on time		1min	
P28.32	The module temperature		0.1°C	
P28.33	Reserved			
P28.34	Frequency fine-tuning		0.01Hz	
P28.35	AC input current		0.1A	
P28.36	Total power Consumption high bit		1kwh	
P28.37	Total power Consumption low bit		0.1kwh	
P28.38	load speed display		1	
P28.39	Accumulate running time(for		1h	

	manufacturer)			
P28.40	Torque compensation		0.0%	
GROUP P29 ： User Parameters GROUP				
P29.00	User password	0~65535	0	
P29.01	Parameter initialization	0: No operation 1: Restore factory default setup value 2: Clear the fault record 3：Clear accumulate running and power-on time	0	
P29.02	Product code	0~65535	Factory Setting	
P29.03	Software version	1.00~10.00	Factory Setting	
P29.04	Inverter rate power	0.4kW~1000.0kW	Factory Setting	
P29.05	Inverter rate voltage	220V~1140V	Factory Setting	
P29.06	Inverter rate current	2.4A~2000.0A	Factory Setting	
P29.07	Factory use			
P29.08	Factory use			
P29.09	Factory use			
P29.10	Factory use			
P29.11	Factory use			
GROUP P30 ： Factory Parameters GROUP				

Chapter 6 Parameter Description

6.1 Group P00 Basic Function

Function code	Name	Setup range	Manufacturer set	Property
P00.00	Motor running mode	0: V/F control mode 1: no-PG vector control mode 0 2: no-PG vector control mode 1	0	

Select inverter running mode, V/F control mode can be selected by P04.00 or P21.00 parameter to choose linear V/F, MS V/F, curve V/F or V/F separation control.

V/F control mode:

One unit of inverter can work with several units of motor, no need to install encoder. It is adaptive to non-high requirement on dynamic response application, as belt conveyor, textile machinery etc. Vector V/F improve further V/F control performance.

No-PG vector control mode 0:

One unit of inverter work with one unit of motor, no need to install encoder. It is adaptive to high performance requirement application, featured with torque precision high and torque response quick.

No-PG vector control mode 1:

One unit of inverter work with one unit of motor, no need to install encoder. It is highly adaptive to application, especially when motor power is big and controlling performance is better.

P00.01	Start/stop command selection	0: keypad command channel (L/R normally off) 1: terminal command channel(L/R normally on) 2: terminal command channel(L/R flash)	0	

Select inverter running command source:

Inverter running command include: start, stop, forward run, reverse run, jog.

Keypad command channel:

Key" RUN, STOP/RESET" on keypad to realize start, stop, fault reset command.

Terminal command channel:

Through multi-function input terminal to realize forward, reverse, forward jogging, reverse jogging etc control command, refer to P05 function code group.

Communication command channel:

Operation command as setup via HOST PC via communication, refer to P15 function code group.

P00.02	Frequency command source A	0: keypad potentiometer 1: function code P00.11 2: AI1 3: AI2 4: AI3(extension card) 5: PLC	0	
P00.03	Frequency command source B		4	

		6: MS speed running 7: HS pulse input 8: PID control set 9: communication set		

Separately choose A, B group frequency command source (note: A,B channel cannot choose the same frequency command source):

Keypad potentiometer setup:

Via potentiometer on rotating panel to change given frequency, can adjust from 0.00Hz to max output frequency P00.07.

Also via keypad ^/v key or terminal UP/DOWN action to realize frequency command fine tuning, refer to function code P09.41~P09.44.

Function code P00.11 setup:

Via set function code P00.11 directly set target frequency

AI1 setup:

AI2 setup:

AI3 setup (extension card):

Via analog set frequency command, AI1 support voltage input. AI2 AI3 support voltage or current input. The relation of AI input voltage(current) and set frequency can be set flexible, refer to function code P05.13~P05.37

PLC set:

Via PLC, target frequency can be switched in 1~16 frequency randomly, the separate running time, speed-up/down time of 1~16 frequency command can be set, refer to function code P11 group.

MS speed command:

Via 4 digits DI input(refer to function code P05) to randomly select one from 16 frequency command as target frequency, refer to function code P11.

HS pulse input set:

Via HDI1 terminal input pulse frequency to set target frequency, support 0.00KHz~100.00KHz pulse input, refer to function code P05.39~P05.43

Communication set:

Frequency set is given by HOST PC communication directly, refer to function code P15 and communication protocol.

PID control setup:

Select process PID control as frequency source, generally used in processing close-loop control, such as pressure close-loop, temperature close-loop, refer to function code P08.

P00.04	Frequency command overlay	0: frequency command source A 1: frequency command source B 2: frequency command source A+B 3: frequency command source A-B 4: max (A, B) 5: min (A, B)	0	

Via P00.04 select A, B frequency channel overlay mode, to realize complicate frequency command preset:

Can separately realize single channel A, single channel B, the sum of two channel, the difference of two channel, the max of the two channel, the min of the two channel.

P00.0	Frequency command source	0: relative to max output frequency	0	

5	B reference range when overlay	P00.07 1: relative to frequency source A		

When B channel work with frequency command integration, through P00.05 and P00.06 to adjust B channel frequency command reference range. If choose frequency source A channel, then frequency source B changes accompanied frequency source A change.

P00.07	Max output frequency	P00.09~650.00Hz	50.00Hz	

Max frequency is the reference of all frequency relative quantity, as pulse input, analog terminal, MS speed etc. Each of the percentage is relative to the max output frequency. Such as analog input 10V, change into 100%, relative (100%xP00.07)Hz.

Note: Output frequency of all operation will not exceed max output frequency.

P00.09	Running frequency upper limit digit setup	P00.10~P00.07	50.00Hz	
P00.10	Running frequency lower limit digit setup	0.00Hz~P00.09	0.00Hz	

P00.09 is used to set running frequency upper limit. The value is less or equal to max output frequency, when set frequency is higher than upper limit frequency then it runs with upper limit frequency.

P00.10 is used as running frequency lower limit. The value is less or equal to upper limit frequency, when set frequency is lower than lower limit frequency and bigger than 0, then P01.20 can be used to setup inverter running mode.

P00.11	Keypad setup frequency	0.00Hz~P00.07(max output frequency)	50.00Hz	

When A or B frequency command channel select function code P00.11 setup, this function code value directly used as its channel frequency command.

P00.12	MS speed command stage 0 Command source	0: function code P11.00 1: function code P00.11 2: AI1 3: AI2 4: AI3 (extension card) 5: HS pulse 6: PID control setup	0	

Selecting MS speed command stage 0 command source, can be set by function code P11.00, also by analog preset to realize flexible adjusting. Refer to P11 MS stage parameter.

P00.14	Speed up time 0	0.0s~3600.0s	Model setting	
P00.15	Speed down time 0	0.0s~3600.0s	Model setting	

Speed-up/down time means time needed if the inverter speed up from 0.00HZ to the reference frequency (P00.16). It is used to set frequency changing slope.

P00.16	Speed-up/down time reference frequency	0: max output frequency P00.07 1: set frequency	0	

Via selecting speed-up/down time unit to change the setting max range of speed-up/down time to meet different requirement.

Speed-up/down time means the time needed if the inverter speed up/down to reference frequency, via changing P00.16 to change frequency speed-up/down slope ratio. When P00.16=1, the time needed from zero frequency speed-up/down to setting frequency is the setting speed-up/down

time.

P00.17	Running direction	0：Direction is consistent 1：1 Direction is reverse	0	○
P00.18	Forbid to run in reverse direction	0：Allowing 1：Forbid	0	○

P00.17 is used to regulate the forward rotation of motor, the same purpose as change any phase of output U,V,W sequence.

P00.18 can set if motor reverse rotating is permitted, to avoid motor reverse rotating causing equipment damage in some application.

⚠ WARNING
● When motor running is reverse with actual required, then can randomly change two lines sequence among U,V,W to change motor running direction. Prohibit to use software to setup the motor running direction.

P00.19	Carrier frequency setup	1.0KHz~16.0KHz	Model setting	

Carrier frequency has important effect to inverter and motor, when carrier frequency rising, the power loss, temperature rising, noise of motor; when carrier frequency decreasing, inverter temperature will decrease. The leakage current of motor

And radiation interference will decrease.

P00.21	Parameter lock selection	0: parameter lock invalid 1: parameter lock valid, not permit changing other parameters except this one 2: not permit operation parameter initialize function code	0	

Setting this parameter as 1 (lock all parameter), except this function code, any function code is not permitted to be changed, preventing user wrong operation. Set the parameter as 2, only locking parameter not been initialized, as P29.01 cannot be set as 1, preventing user from initializing parameter. If the parameter set as 0, user can randomly change function code.

P00.22	Inverter G/P type	0: G model 1: P model	0	

If user set as P model, inverter is amplified one class. But after amplified overload capacity get weaker, can only be used as light load application, at present inverter will act in overload protection. If set as G model, inverter must match with motor, inverter will act in overload protection. Please refer to model list.

P00.23	Motor parameter self-learning	0: no operation 1: dynamic self-learning 2: static self-learning	0	

If select NO-PG vector operation, must get motor parameter dynamic self-learning. If carry out motor parameter dynamic self-learning, motor must get off with load or light load, if not, will increase error so cannot acquiring more precision motor parameter.

P00.24	AVR function selection	0: invalid 1: valid	1	

Inverter output voltage will automatically adjust function, to eliminate the effect of bus voltage fluctuation to inverter output voltage.

P00.25	Over-modulation selection	0x00~0x11 LED the unit bit: 0: over-modulation invalid 1: over-modulation valid LED the decade: 0: light over-modulation 1: depth over-modulation	0x01	

The function is used as boost inverter output voltage properly, in general condition user has no need to adjust the parameter.

P00.26	Motor 1 and 2 selection channel	0: function code P00.27 1: terminal 2: communication	0	
P00.27	Motor selection keypad set	0: motor 1 1: motor 2	0	

VD300 support 2motors switching, can keep independent 2motors parameter, including corresponding control parameter can be set separately, random switching. Motor can be selected by terminal, communication selection, or P00.27.

P00.28	Load type selection (only valid for V/F)	LED the unit bit: motor 1 load type selection 0: non-inertia load 1: inertia load LED the decade bit: motor 2 load type selection 0: non-inertia load 1: inertia load	0x00	

This function is used when inverter running in V/F mode and selecting load motor load type.

6.2 P01 start stop control parameter group

P01.00	Start operating mode	0: start with starting frequency 1: first DC brake then start 2: RPM tracking start	0	◎

Set motor start mode:

start with starting frequency:

Firstly operating a period with setup start frequency and start frequency keep time, then speed-up/down operate according to speed-up/down time setup slope. Refer to P01.01

Firstly DC brake then start:

According to current value and retention time, keep DC current for a while, then start 0 mode.

RPM tracking start:

Inverter firstly check motor RPM, then detect motor RPM start.

P01.01	Start frequency	0.00Hz~10.00Hz	0.00Hz	
P01.02	Start frequency retention time	0.0s~60.0s	0.0s	

Start frequency is the initial frequency when inverter starting, as below diagram showed, start frequency retention time

Is the running time under start frequency. Start frequency generally set 1Hz~2Hz.

In low power application, by setting start frequency can quickly buid slip, which is helpful in quickly start motor. For big power or heavy load application, properly extend start frequency retention time, can pre-excitating motor and reduce start current and boost start torque. If motor is rotating when start, can make motor speed getting low then speed up later.

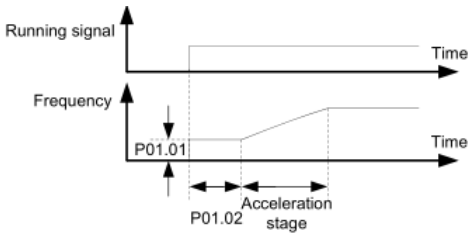


Fig 6.2-1 Schematic diagram for startup frequency

P01.03	Brake current before start	0.0%~100.0% (inverter rate current)	0.0%	
P01.04	Brake time before start	0.00s~60.00s	0.00s	

The DC brake before starting is the DC current before motor rotating output for in a period, P01.03 set input DC current value, 100.0% is relative to inverter rate current. P01.04 set the time of DC input. Through input DC current to realize the magnetic brake and pre-excitation of motor. For big power and heavy load application, via pre-excitation, start torque get bigger, impact current get smaller.

DC brake before start process as below diagram:

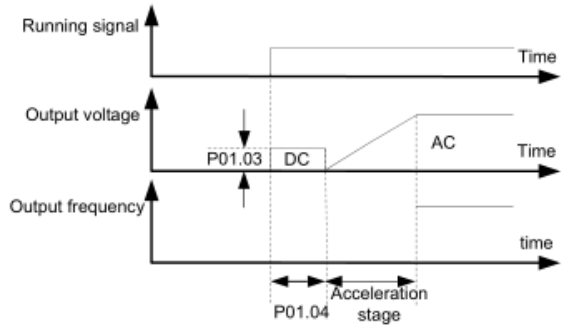


Fig 6.2-2 Schematic diagram for the braking current before starting

\

P01.05	Stop mode selectin	0: speed reducing stop 1: random stop	0	

Speed-down to stop: speed-down stop is motor relying on inverter brake, under set speed-down time reducing to zero. Different application can adopt different stop mode.

Random stop: random stop is inverter cut off motor current after receiving stop command, motor relying its inertia reduce speed to zero.

DANGER

Free stop, the motor is still in the high speed rotation, to prevent equipment damage or personal injury caused by!

P01.06	Stop brake starting	0.00Hz~P00.07	0.00Hz	

	frequency			
P01.07	Stop brake waiting time	0.00s~60.00s	0.00s	
P01.08	Stop DC brake current	0.0$~100.0%	0.0%	
P01.09	Stop DC brake time	0.00~60.00S	0.00s	

During speed-down process, if frequency reducing to P01.06, waiting P01.07 setup time, starting input DC current to motor, speed-up braking. The input current value is set by P01.08, 100.0% is equal to rate inverter current, input DC current time is set by P01.09, if brake time is 0, then no need this process. Such as below diagram:

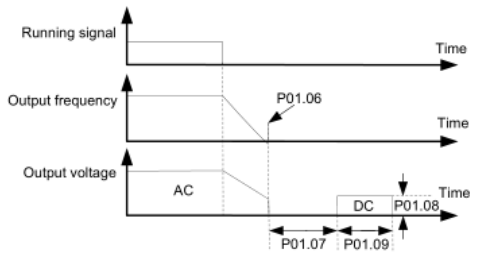


Fig6.2-3 Schematic diagram for DC brake time at stop

DC braking stage, motor rotator maintains certain holding power, preventing rotator no steady or wriggle after stop.

P01.10	Flux brake factor	0: invalid 100~150: the bigger the factor is, the stronger the brake strength is.	0	○

Inverter can make motor quickly reducing speed by increase motor magnetic flux. By increasing motor magnetic flux, motor generated energy in braking can be transformed to heat.

Magnetic flux can be used in motor stop, can also be used in changing motor speed. Its feature: brake once stopped, no need to wait magnetic flux weak then brake; further more, motor cooling effect is better, during excitation brake period, motor stator current increase, rotator current not increase, and stator cooling is faster than rotator.

P01.11	Short circuit brake current	0.0%~150.0%(100% relative to inverter rate current)	0.0%	○
P01.12	Start short circuit brake retention time	0.00s~60.00s	0.00s	○
P01.13	Stop short circuit brake retention time	0.00s~60.00s	0.00s	○

When the parameter value is set to a non 0, inverter output in start and stop is equivalent to get short circuit of U, V, W motor output.

P01.12 and P01.13 separately used to set start or stop short circuit brake retention time.

P01.14	Forward/reverse switch mode	0: over-zero frequency switch 1: over starting frequency switch 2: over stop speed and extend then switch	0	◎
P01.15	Forward/reverse deadzone time	0.0s~3600.0s	0.0s	○

When motor is switching to reverse direction, can select direct over-zero frequency switch, can

also select start frequency switch, or motor reduce to 0 speed then switch after through forward/reverse deadzone time. As below diagram showed:

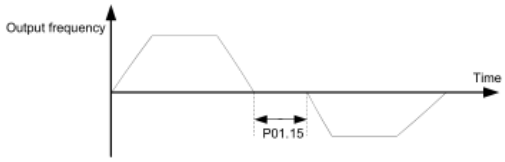


Fig 6.2-4 Schematic diagram for Dead time of FWD/REV rotation

P01.16	Stopping speed	0.00Hz~100.00Hz	0.50Hz	◎
P01.17	Detection of stopping speed	0：Detect according to speed setting (No stop delay) 1：Detect according to speed setting (No stop delay) （Only valid for vector control ）	0	◎
P01.18	Detection time of feedback speed	0.0s~100.0s（Only valid for P01.17=1）	0.50s	◎
P01.19	Stopping speed delay time	0.0s~100.0s	0.0s	○

When the inverter output frequency to slow down to stop the speed and frequency converter downtime (blockade output), motor inertia parking

When the motor running mode to vector control, and P01.17 is set to 1, less than P01.16 actual output frequency of frequency converter, and P01.18 set time detection, frequency converter downtime; Otherwise, keep the inverter stop speed and delay P01.19 set by time after downtime.

P01.20	Running frequency lower than frequency lower limit action	0: run with lower limit frequency 1: stop 2: dormant standby	0	◎
P01.21	dormant recover extension time	0.0s~3600.0s(relative to P01.20=2)	0.0s	○

When the lower limit of frequency converter set greater than zero, P01.20 is used to set the inverter real output frequency is lower than the lower limit frequency converter running state.

When set to 2, P01.20 P01.21 set dormancy recovery delay effectively. If you need to restart the output, you must meet the output frequency is greater than the lower limit of frequency, and greater than the lower frequency of accumulative length more than hibernation recovery delay time.

P01.22	Terminal running protection when power on	0：The terminal running command is invalid 1：The terminal running command is valid	0	○

The terminal running command is invalid：

Run when the inverter is powered on, if the terminal has been effective, after power on, the inverter will not response terminals running commands, run to terminal is invalid after a period of time, frequency converter to run normal response to a terminal. In addition, when the inverter after failure occurs, terminal operation command must be invalid for a period of time, otherwise the frequency converter does not respond to run terminal

The terminal running command is valid：

When the inverter is powered on or failure, terminals have been effectively run the command, the inverter will run according to the terminal, start the motor run directly. This may lead to the expected results or dangerous.

P01.23	Restart after power off	0：Disable 1：Enable	0	○
P01.24	The waiting time of	0.0s~3600.0s	1.0s	○

	restart after power off			
P01.25	start delay time	0.0s~60.0s	0.0s	◎
P01.26	/speed up/ down mode selection	0：Liner 1：S curve（reserved）	0	◎
P01.27	started proportion S curve	0.0%~（100.0%-P01.27） （Relative to the add/deceleration time)	30.0%	●
P01.28	the ended proportion of s curve	0.0%~（100.0%-P01.28） （Relative to the add/deceleration time）	30.0%	●

When inverter power outrage, then restart, to see if inverter can auto start running. If inverter

Additive deceleration curve: select inverter in the addition, reduction and so on frequency change in the process of frequency change. If choose linear deceleration, frequency variation of the slope is fixed, change slope is determined by the deceleration time. If choose the S curve, frequency changes, the slope is always starting from 0 change, add, deceleration is complete, the slope is ended with gradually to 0. Due to the continuous changes in the slope, the motor output is the smallest impact on load device, and is suitable for the shock, comfort has certain requirements, such as elevator, belt
conveyor, etc.

6.3 P02 Motor 1 Parameters

P02.00	Motor 1 type	0: General asynchronous machine	0	
P02.01	Motor 1 rate power	0.4kw~1000.0kw	Model setting	
P02.02	Motor 1 rate voltage	0V~1500V	Model setting	
P02.03	Motor 1 rate current	0.0A~2000.0A	Model setting	
P02.04	Motor 1 rate frequency	0.00Hz~P00.07(max output frequency)	Model setting	
P02.05	Motor 1 rate RPM	0RPM~65535RPM	Model setting	

Caution： above parameter is setting motor 1 General asynchronous machine, user input motor nameplate parameter in inverter.

Note: The power of General asynchronous machine should match with the inverter power class. Generally the operating motor power is higher one class than inverter power, or motor power is smaller two standard class than inverter power. Otherwise the control performance will be decreased.

P02.06	Stator resistance of motor 1	0.000Ω~65.535Ω	model dependent	○
P02.07	Rotor resistance of motor 1	0.000Ω~65.535Ω	model dependent	○
P02.08	Leakage inductive Reactance of motor 1	0.0mH~6553.5mH	model dependent	○
P02.09	Mutual inductive Reactance of motor 1	0.0mH~6553.5mH	model dependent	○
P02.10	No-load current of motor 1	0.0A~P02.03（Rated current of motor 1）	model dependent	○

When the automatic tuning of the motor is normally completed, the setup values will be automatically

updated.

Each time when the rated power of the motor is changed, the inverter will automatically If it is impossible to tune the motor on the site, the user can manually input the parameters by referring to the known parameters of the motors of the same type.

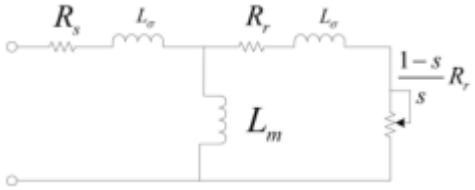


Fig 6.3-1Schematic Diagram for mathematical model of single phase motor

6.4 P03 Motor 1 Vector Control Parameters Group

P03.00	Speed and torque control selection	0：Speed control 1：Torque control		0	◎
P03.01	Speed loop proportional gain 1	0~200.0	When P00.00=1default10.0 whenP00.00=2default20.0		○
P03.02	Speed loop integration Time1	0.000s~10.000s		0.200s	○
P03.03	Switching frequency	0.00Hz~P03.06		5.00Hz	○
P03.04	Speed loop proportional gain 2	0~200.0	whenP00.00=1 default5.0 whenP00.00=2 default10.0		○
P03.05	Speed loop integration time 2	0.000s~10.000s		0.100s	○
P03.06	Switching frequency 2	P03.03~P00.07（the maximum frequency）		10.00Hz	○

Above parameter setup vector control speed loop PI parameter, can set two groups of parameter and separately used fro low frequency high frequency operation. The two groups of parameters can be smoothly switched according to switch frequency 1 and switch frequency 2, as below diagram showed.

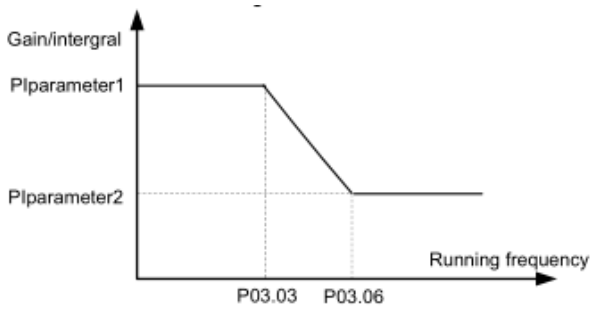


Fig 6.4-1Schematic Diagram for speed loop parameter switching

Speed loop proportion gain (P03.01、P03.04)：

Please according to load inertia and motor to adjust the parameters, for larger inertia load, please increase the proportional gain. For small inertia load, reduced the proportional gain. When the rate of speed loop gain slants big, although the response speed is faster, but may occur motor speed oscillation and overshoot. On the contrary, if the proportional gain ratio is too small, the control response becomes slow, so speed adjusting to the stable value is too long. As shown in figure 6 -11.

Speed loop integral time （P03.02、P03.05)：

Same as the proportional gain, the speed loop integral time is short, fast control response, but if it is too small may lead to oscillation and instability. When the integration time is larg, the control response is slow, speed deviation elimination is getting longer. So all requirements will be appropriately adjusted based on actual situation. As shown in the figure below:

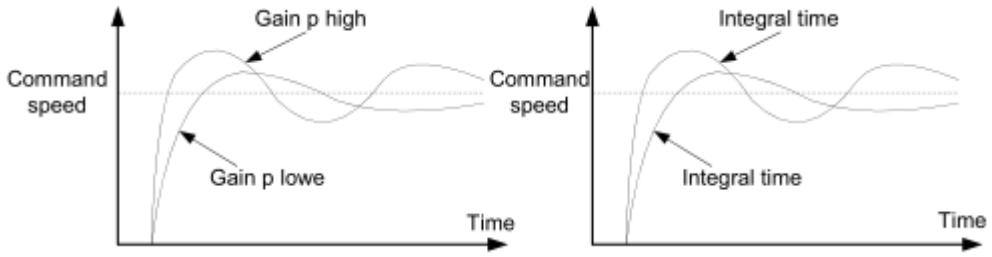


Fig 6.4-2 Schematic Diagram for speed loop PI parameter

P03.07	Speed loop output filter	0~8(relative to 0~2^8/10ms)	0	

Speed loop output filter: speed loop output via first-order filter was sent to current controller, by increasing this filter to decrease the output current ripple, but dynamic response will be slow down.

P03.08	Vector control slip compensation factor (motoring condition)	50.0%~200.0%	100.0%	
P03.09	Vector control slip compensation factor (motoring condition)	50.0%~200.0%	100.0%	

Slip compensation factor is used in adjusting vector control slip frequency, to improve system speed control precision, properly adjust the parameter, can effectively suppress speed offset.

P03.10	Current loop proportion factor P	0~60000	1000	
P03.11	Current loop integration factor I	0~60000	1000	

Above current loop PI adjusting parameter is only applied for vector control mode 1.

WARNING

The two parameters in PI adjustments of the adjustment of the current loop, it directly affect the system's dynamic response speed and control precision, a group of cases, the user does not need to adjust

P03.12	Torque setting mode selection	0: function code P03.13 1: AI1 2: AI2 3: AI3 (extention card) 4: HS pulse input 5: communication setup Note: 1~4 100% relative to P03.13	0	

Vector torque control, torque command can be set by function code P03.13, can also be set by analog, HS pulse input, communication. 1~4 full scale 100% relative to P03.13.

P03.13	Keypad set torque	-300.0%~300.0% (100% relative to motor rate current)	100.0%	
P03.14	Torque set filter time	0.000s~10.000s	0.100s	

Keypad set torque: inverter output torque is directly set by keypad input. 100% relative to motor torque of its rate current.

Torque set the filter time: used to set torque setting changing rate, the bigger the more slower, better for torque stability, but the motor response speed can be slow down.

P03.15	Torque control forward upper limit source setup	0: function code P03.17 1: AI1 2: AI2	0	

		3: AI3 (extention card) 4: HS pulse input 5: communication set Note: 1~4 100% relate to max output frequency		
P03.16	Torque control reverse upper limit source setup	0: function code P03.18 1: AI1 2: AI2 3: AI3 (extention card) 4: HS pulse input 5: communication set Note: 1~4 100% relate to max output frequency	0	

Used to select torque control mode forward, reverse frequency upper limit setting source.

P03.17	Torque control forward upper limit keypad setup value	0.00Hz~P00.07(max output frequency)	50.00Hz	
P03.18	Torque control reverse upper limit keypad setup value	0.00Hz~P00.07(max output frequency)	50.00Hz	

When under torque control mode, forward/reverse upper limit frequency is set by keypad, the above two function code separately relative to forward, reverse upper limit frequency set value.

P03.19	Motor torque upper limit source set	0: function code P03.21 1: AI1 2: AI2 3: AI3 (extention card) 4: HS pulse input 5: communication set Note: 1~4 100% relative to 3times motor current	0	
P03.20	Brake torque upper limit source set	0: function code P03.22 1: AI1 2: AI2 3: AI3 (extention card) 4: HS pulse input 5: communication set Note: 1~4 100% relative to 3times motor current	0	

Used to select motor, brake torque upper limit setting source.

P03.21	Motor torque upper limit keypad setup	0.0%~300.0% (motor rate current)	180.0%	
P03.22	Brake torque upper limit keypad setup	0.0%~300.0% (motor rate current)	180.0%	

When motor/brake torque upper limit is set by keypad, the two function code is separately relative to motor/brake torque set upper limit.

P03.23	Max voltage limit	0.0%~120.0%	100.0%	

Used to set inverter max output voltage.

P03.24	Pre-excitation time	0.000s~10.000s	0.300s	

Pre-excitation time: magnetic flux is build up before motor started, in order to make motor start quick response. If there is running command, the function code will enter to pre-excitation state according to set tie, once magnetic flux has build up, then enter to normal speed up running.

P03.25	Constant power weak flux factor	0.1~2.0	0.3	
P03.26	Constant power weakest flux point	10%~100%	20%	

In vector control mode, when motor running speed is higher than rate RPM, motor enter to weak flux running stator. Via setting weak flux factor can change weak flux curve, the value is bigger the flux curve is more steep, vice versa, the flux curve getting more flat. As below diagram:

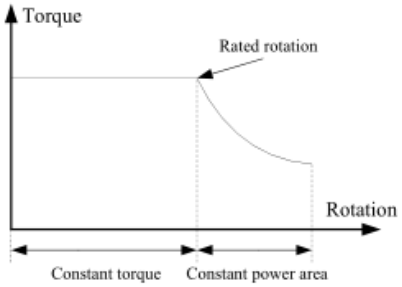


Fig 6.4-3 Weak magnetic function diagram

P03.27	Vector control weak flux Proportional gain	0~4000	1200	

In vector control mode, when motor RPM is higher than rate RPM, this parameter is used to adjust current response speed.

P03.28	Low frequency torque compensation factor	0.0%~50.0%	0.0%	
P03.29	High frequency torque compensation factor	0.0%~50.0%	0.0%	
P03.30	Low frequency torque compensation cutoff frequency	0.00Hz~50.00Hz	5.00Hz	
P03.31	high frequency torque compensation cutoff frequency	0.00Hz~100.00Hz	50.00Hz	

Above 4 parameter are under torque control mode, separately used to set low frequency compensation factor and low frequency compensation cutoff frequency, high frequency compensation factor and high frequency compensation cutoff frequency. When inverter output frequency lower than P03.30, torque compensation is P03.28 setting factor; when inverter output frequency is higher than P03.31, torque compensation is P03.29 setting factor; when inverter output frequency is between P0.30~P03.31, torque compensation is P03.28 and P03.29 linear runin factor.

P03.32	Speed-up/down torque compensation factor	0.000~10.000	0.000	

P03.33	Speed-up/down torque compensation upper limit	0.0%~50.0%	5.0%	
P03.34	Speed-up/down torque compensation lower limit frequency	0.00Hz~50.00 Hz	10.00Hz	

Above 3 parameters are under vector control mode, when motor is under speed-up/down status, its torque compensation factor, compensation upper limit and compensation lower limit frequency. So properly set the group parameter is helpful for stop/start or speed-up/down invariable tension.

6.5 P04 motor 1 V/F Control Parameters Group

P04.00	Motor 1 V/F curve setup	0: linear V/F curve 1: multi-stage V/F curve 2: 1.3 # torque V/F curve 3：1.7 # torque V/F curve 4：2.0 # torque V/F curve 5: V/F complete separation 6: V/F half separation	0	◎

If P00.00 set as 0(V/F control mode), then V/F type is set by P04.00. User can select appropriate V/F curve type according to loading type. If loading is wind pump water pump etc, generally select square V/F curve, 2.0 # power. As below diagram:

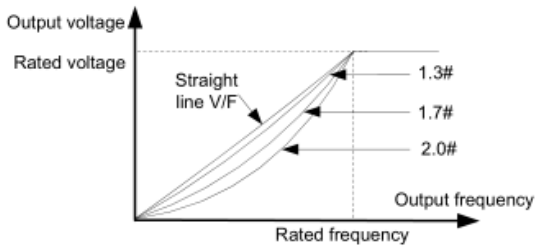


Fig 6.5-1 Schemaic Diagram for Parabolic type

P04.02	MS V/F frequency point 1	0.00Hz~P04.04	0.00Hz	○
P04.03	MS V/F voltage point 1	0.0%~110.0%（Rated voltage of motor 1）	0.0%	○
P04.04	MS V/F frequency point 2	P04.02~P04.06	0.00Hz	○
P04.05	MS V/F voltage point 2	0.0%~110.0%（Rated voltage of motor 1））	0.0%	○
P04.06	MS V/F frequency point 3	P04.04~P00.07（Max output frequency）	0.00Hz	○
P04.07	MS V/F voltage point 3	0.0%~110.0%（Rated voltage of motor 1）	0.0%	○

When P04.00 set as 1(MS V/F), each stage frequency and voltage can be set by above function code, details as below diagram. The 1st point is 0.00Hz, output voltage is manual torque boost (P04.09) corresponding voltage. The 5th point is rate frequency, output voltage is rate voltage. Other voltage is formed by 5points linear interpolation. MS V/F is used in special application which users has output voltage requirement, or be used in solving some frequency point with resonance phenomena.

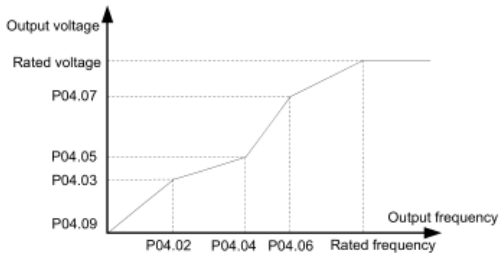


Fig 6.5-2 Schematic Diagram for MS V/F Curve

P04.08	Motor 1 V/F slip compensation gain	0.0%~200.0%	100.0 %	○

slip compensation gain: used in V/F control mode compensation when loading changes caused motor RPM changes, to improve motor mechanic feature hardness.

The parameter is used in calculating slip frequency, set value 100% stand for rate torque current corresponding with rate slip frequency, so reasonable slip compensation gain system can precisely adjust speed control offset. The parameter set principle: when motor with heavy loading and speed getting lower, it needs to increase the factor, otherwise to reduce the factor.

P04.09	V/F manual torque boost	0.0%: auto torque boost 0.1%~10.0%	0.0%	○
P04.10	Manual torque boost cutoff frequency	0.0%~50.0%(relative to motor 1 rate frequency)	20.0 %	◎

When motor is running under V/F control mode, in order to make up motor stator resistance voltage loss, it needs to compensate certain voltage value, can be set by P04.09, referring to below diagram. Compensation 100.0% is equal to motor rate voltage, generally could not exceeding 10.0%.

The heavy the load, the bigger the boosting, but if the set value is too big can result in burning the motor.

Manual torque boost parameter is effective with linear V/F, parabola V/F, MS V/F.

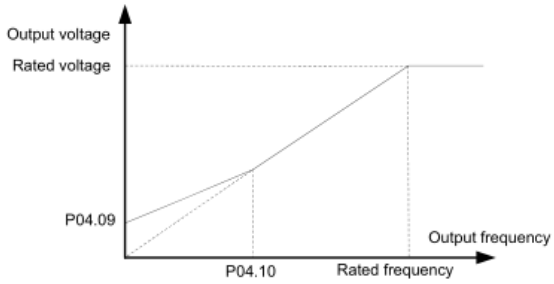


Fig 6.5-3 Schematic Diagram for torque boost

P04.11	Motor 1 low frequency suppression Vibration factor	0~100	10	○
P04.12	Motor 1 high frequency suppression vibration factor	0~100	10	○
P04.13	Motor 1 suppression vibration dividing point	0.00Hz~P00.07(max output frequency)	30.00Hz	○

When motor is under V/F control mode, especially loading motor is big power motor, it can easily cause current oscilation, lightly that motor cannot run steadily, severely that motor can result inverter overcurrent error. At the moment it can properly set this group parameter to eliminate such

problem.

P04.14	Motor 1 voltage set channel selection	0: function code P04.15 1: AI1 2: AI2 3: AI3 (extention card) 4: HS pulse input 5: PID control set 6: communication set	0	◎

When selecting inverter load as V/F separation control (P04.00=5), select output voltage set channel.

P04.15	Motor 1 keypad set voltage value	0.0%~100.0%	100.0%	○

This parameter is used to set the V/F separation control the output voltage of the keyboard settings.

P04.16	Motor 1 voltage increase time	0.0s~3600.0s	5.0s	○
P04.17	Motor 1 voltage decrease time	0.0s~3600.0s	5.0s	○
P04.18	Motor 1 max output voltage	P04.19~100.0%(motor 1 rate voltage)	100.0 %	◎

Used to set the output voltage lower/upper limit in V/F separation control, and the time needed for output voltage increase from 0 to the upper limit or from upper limit decreasing to 0.

P04.20	Motor 1 V/F control weak flux factor	1.00~1.30	1.00	○

In V/F control mode, when motor RPM is higher than rate RPM, motor enter into weak flux running status. Via setting weak flux factor to change its curve, the bigger value it is ,the more steeper the curve is, and vice versa, the flux curve getting more flat. Refer to reference function code P03.27

P04.21	Motor 1energy saving running selection	0: prohibit 1: permit	0	◎

This function is used to set the light load motor state, if open the energy saving operation. If open, when the motor in light load condition, the inverter will automatically adjust the output voltage, in order to achieve the goal of energy saving.

6.6 P05 Input terminals function parameter group

P05.00	Terminal control running mode	0： Two-line mode 1 1： Two-line mode 2 2： Three-line mode 1 3： Three-line mode 2 4: alternative control	0	

This parameter defines five different modes of controlling the operation of the inverter via the external terminals

1: Two-line running mode 1: This mode is the most commonly used two-line mode. The forward/

reverse rotation of the motor is decided by the commands of DIx 、DIy terminals.

Terminal	Setting value	Description
Dix	1	Forward running
DIy	2	Reverse running

DIx、DIy is DI1~DI5、HDI1 Multi function digital input terminals, electric level valid.

K1	K2	command
0	0	stop
1	0	FWD
0	1	REV
1	1	Keep

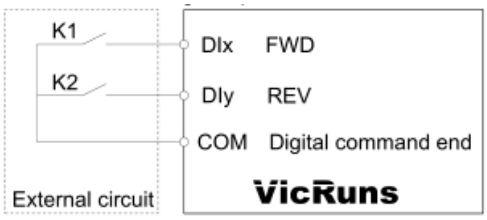


Fig 6.6-1 Schematic diagram of two line mode 1

Two-line running mode 2: When this mode is adopted, DIx is enabled terminal. The direction is determined by the status of DIy. Terminal function set as below.

Terminals	Setup	Description
DIx	1	Runnig
DIy	2	（FWD/ REV）

DIx、DIy is DI1~DI5、HDI1 Multi function digital input terminals, electric level valid.

K1	K2	Running
0	0	Stop
1	0	FWD
0	1	Stop
1	1	Revers

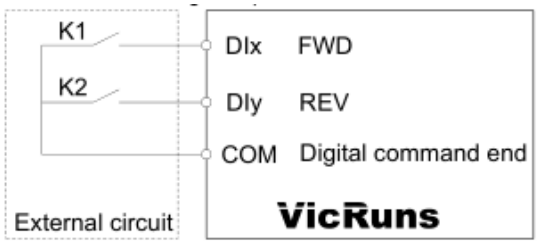


Fig 6.6-2 Schematic diagram of two line mode 2

Three-line control mode 1: In this mode, DIn is enabled terminal, and the direction is controlled by DIx、DIy respectively.

Terminal function set as below.

Terminals	Setup	Description
DIx	1	（FWD）
DIy	2	（REV）
DIn	3	Three-line control mode 1

(1) when the need to run, must be closed first DIn terminals, implemented by DIx or DIy pulse rising to realize the motor forward or reverse control;

(2) when to stop, it should be done by disconnect DIn terminal signal;

(3) the DIx, DIy, DIn is DI1 ~ DI5, HDI1 multi-function digital quantity input terminals, DIx, DIy for pulse

effectively, the DIn of level effectively;

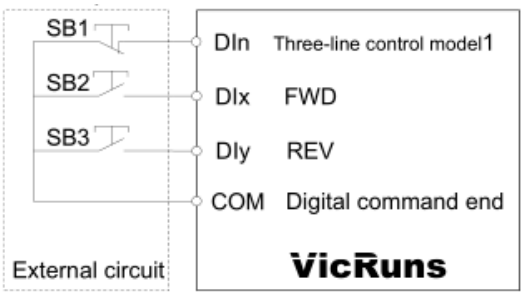


Fig 6.6-3 Three-line control mode 1

SB1: Stop button SB2: Forward rotation button SB3: Forward rotation button

Three-line running mode 2: In this mode, DIn is enabled terminal, and the running command is given by DIx, while the direction is determined by the status of DIy. Terminal function set as below:

Terminals	Setup	Description
DIx	1	Running
DIy	2	（FWD /REV）
DIn	3	Three-line control mode 2

(1) when the need to run, must be closed first DIn terminals, produced by DIx pulse rising along the motor running signals, DIy status produce motor rotating direction signals.

(2) when to stop, it should be done by disconnect DIn terminal signal.

(3) the DIx, DIy, DIn is DI1 ~ DI5, HDI1 multi-function input terminals, DIx for pulse effectively, DIy, DIn for level effectively.

K	Command
0	FWD
1	REV

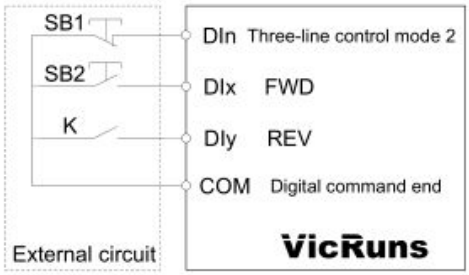


Fig 6.6-4 Three-line control mode 2

SB1: Stop button SB2: Running button K: forward/reverse switch

Alternative control mode: this mode Din as enabled terminal, running and the rotating direction and stop are separately controlled by Din DIy alternatively. Terminal function as below:

Terminal	Set value	Description
Dix	1	Forward, stop
DIy	2	Reverse, stop
DIn	4	Alternative control mode

Din terminal must be closed before operating, the initial pulse rising by DI x DIy to control motor forward or reverse rotating.

The second pulse rising to control stop, and such repeat operation to control inverter start/ stop.

Note: DIx or DIy as start signal and meanwhile as direction signal, if as stop signal then the effect is the same. As for the first time after the electricity through DIx terminal to make it produce a pulse let inverter is running, the need to stop when the second pulse can be produced by DIx delay can also be produced by the DIy, the third pulse will delay let inverter is up and running, running direction by a third impulse signal is produced DIx or pulse produced by DIy.

At the same time, through disconnect DIn terminal signal can also achieve the downtime control

frequency converter.

Among them, the DIx, DIy, DIn is DI1 ~ DI5, HDI1 multi-function digital quantity input terminals, DIx, DIy for pulse effectively, the DIn of level effectively.

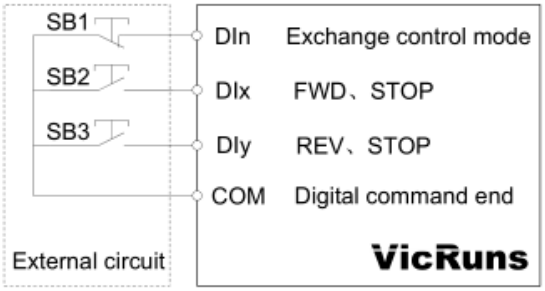


Fig 6.6-5 Alternate control mode

SB1：Stop button、SB2：FWD、STOP button、SB3：REV、Stop button

P05.01	Digital input function selection of D11	0~63，Table below	1	◎
P05.02	Digital input function selection of D12		2	◎
P05.03	Digital input function selection of D13		4	◎
P05.04	Digital input function selection of D14		6	◎
P05.05	Digital input function selection of D15		8	◎
P05.06	Digital input function selection of HD1		0	◎
P05.07	Digital input function selection of D17		0	◎
P05.08	Digital input function selection of D18		0	◎
P05.09	Digital input function selection of D19		0	◎

This parameter is used to set the functions of the multifunctional digital input terminals.

Set value	Function	description
0	No function	The terminals not being used can be set " no function", to avoid wrong operation.
1	Forward running	Via external terminals to control inverter forward reverse running
2	Reverse running	
3	Three-line running control	Via this terminal to confirm the inverter running mode is 3line running or alternative control mode. Refer to function code P05.00 ("terminal control running mode") description.
4	（FJOG）	FJOG is jog forward running, RJOG is jog reverse running. Jog running frequency, jog speed-up/down time refer to function code P09.00,P09.01,P09.02 description.
5	（RJOG）	In any control mode (panel control, terminal control, communication control), inverter block output, at present motor stop is not controlled by inverter. This method is the same as P01.05 described random stop.
6	Free stop	Inverter speed-down stop, all running parameter is in memory status; running is paused or stopped without receiving start signal, electric level effective.

7	Running pause	Inverter speed-down stop, but all running parameter is in memory state, while running it doesn't accept start/stop signal, electric level effective.
8	Fault reset (RESET)	Using terminal function to reset error, the same function as keypad RESET. This function can realize long distance error reset.
9	External fault input	When external error signal pulse sent to inverter, inverter alarm error Er017.
10	Frequency setting （UP）	By external terminal pre-set frequency to change frequency up/down command. Setting frequency can be goes up/down.
11	Frequency setting （DOWN）	When frequency preset is digital preset or analog preset, the terminal jog can clear terminal UP/DOWN or keypad UP/DOWN to change frequency, to make frequency preset frequency recovering to initial value, pulse effective.
12	Frequency setting clean Up	When frequency to a digital or analog given to the timing, the terminal point move can remove terminal keyboard UP/DOWN or UP/DOWN frequency values change by the given frequency back to the initial value, pulse effectively.
13	Frequency setting clean up temporarily	When frequency to a digital or analog given to the timing, the terminal can remove temporarily closed terminal keyboard UP/DOWN or UP/DOWN frequency values change by the given frequency back to the initial value, terminal disconnect after return to terminal keyboard UP/DOWN or UP/DOWN frequency values change by level effectively.
14	Speed-up/speed-down time selection 1	It can select four types of speed-up/speed-down time through the combination of digital status of these two terminals. Refer to attached table 2 for detail.
15	Speed-up/speed-down time selection 1	
16	MS speed command 1	It can realize 16S speed through the combination of digital status of these four terminals. Refer attached table 1 for the 16 MS speed function and other 16 commands.
17	MS speed command 2	
18	MS speed command 3	
19	MS speed command 4	
20	MS speed pause	When the terminal is effective, MS speed function is invalid temporarily and return to the original frequency temporarily; When the terminal failure, the inverter recover to MS speed running state.
21	Instant DC Brake	This terminal is enabled, and the inverter directly switches to the DC brake status
22	DC brake of speed down	The terminal is valid, slow down to stop inverter and DC braking starting frequency, and then switch to DC braking state;
23	External stop	In any control mode, the terminal is used to make frequency

		converter and speed down and stop or free stop, stop method by function code P01.05 setting determines;
24	Emergency stop function	The terminal is valid, inverter stop at the fastest speed
25	PID Control Pause	PID temporarily adjusting
26	PID action direction reverse	The terminal is valid, PID action direction and the reverse direction set by P08.04 set
27	PID parameters switch	To switch PID parameter
28	Pre-excitation command	The terminal (level) is effective, the inverter excitation of effective is valid until the terminal is invalid;
29	Torque control prohibit	To prohibit the inverter from torque control, inverter enter into speed control method
30	Speed-up/speed-down prohibit	Protect the inverter from affecting by the external signals (except emergency stop command), and maintain the current output frequency
31	A setup and B setup switching	When the command source is valid, the inverter frequency source can be switched in various frequency source or frequency source combination.
32	Combination setup and A setup switching	
33	Combination setup and B setup switching	
34	Simple PLC reset under stop status	In stop state, when the terminal (pulse) effectively, the inverter recover to initial status of PLC
35	Simple PLC pause	Inverter in the executive summary of PLC operation process, when the terminal effective (level), simple PLC to suspend operation, when the terminal failure, the inverter easy to recover from a pause state of PLC operation.
36	Counter trigger	The input terminal of counter
37	Counter reset	Clear up the counter status.
38	Length trigger (reserve)	Input terminal of length counter
39	Length reset (reserve)	Length counter clear up
40	Command switch to keypad	When the terminal effective (level), switch the inverter command source to the corresponding command source.
41	Command switch to terminal	
42	Command switch to communication	
43	Power consumption clear	Clear up the power consumption counter (pulse effective)
44	Power	Keep the power consumption counter, but the inverter present

	consumption retention	running of power consumption is not accumulated (electric level effective)
45	Swing frequency pause (stop at present frequency)	The inverter keep present output frequency. Swing frequency function paused.
46	Swing frequency reset (back to central frequency)	Inverter keep the central frequency output, Swing frequency function valid
47	switch from motor 1 to motor 2	If the function is set as valid, will switch from motor 1 to motor 2, meanwhile motor parameter and corresponding control parameter will be switched, level effective.
48	Present running time clear	When this terminal effective, the inverter counting time of present running is cleared, the function and present running arrival time (P09.32) can be cooperatively used.
49	User defined error input 1	When user defined external error normally closed signal is sent to inverter, inverter alarm, error will be disposed according to alarm protection action mode.
50	User defined error input 2	When user defined external error normally closed signal is sent to inverter, inverter alarm, error will be disposed according to alarm protection action mode.
51	User defined error input 3	When user defined external error normally closed signal is sent to inverter, inverter alarm, error will be disposed according to alarm protection action mode.
52	User defined error input 4	When user defined external error normally closed signal is sent to inverter, inverter alarm, error will be disposed according to alarm protection action mode.

Attached Table 1 MS Speed Function Description

K4	K3	K2	K1	Frequency Setup	Corresponding Parameter
OFF	OFF	OFF	OFF	MS speed 0	P11.00
OFF	OFF	OFF	ON	MS speed 1	P11.01
OFF	OFF	ON	OFF	MS speed 2	P11.02
OFF	OFF	ON	ON	MS speed 3	P11.03
OFF	ON	OFF	OFF	MS speed 4	P11.04
OFF	ON	OFF	ON	MS speed 5	P11.05
OFF	ON	ON	OFF	MS speed 6	P11.06
OFF	ON	ON	ON	MS speed 7	P11.07
ON	OFF	OFF	OFF	MS speed 8	P11.08
ON	OFF	OFF	ON	MS speed 9	P11.09
ON	OFF	ON	OFF	MS speed 10	P11.10
ON	OFF	ON	ON	MS speed 11	P11.11
ON	ON	OFF	OFF	MS speed 12	P11.12
ON	ON	OFF	ON	MS speed 13	P11.13
ON	ON	ON	OFF	MS speed 14	P11.14
ON	ON	ON	ON	MS speed 15	P11.15

4 MS speed command terminals can be combined into 16 kinds of status, which corresponding to 16kind of status and 16 command setup value, as shown in table 1.

Multistage speed instruction except as a multistage speed function, also can be a given source of PID, in order to meet the different demand of various setup value.

When frequency source is choosing as multi-stage speed, function code P11.00 ~ P11.15 100.0% corresponding with max output frequency P00.07.

When MS command source as PID given source, function code P11.00~P11.15 100.0% corresponding with PID feedback range 100%, the full range of feedback meter.

⚠ WARNING
● In all frequency command source, the MS speed command priority is highest , when multistage speed arbitrary terminals function is effective, multistage speed command is in priority.

Attached Table 2 Speed-up/down time selecting terminal function description

Termimals 1	Termimals 2	Speed-up/speed-down time selection	Corresponding Parameter
OFF	OFF	Speed-up/speed-down 0	P00.14、P00.15
OFF	ON	Speed-up/speed-down 1	P09.03、P09.04
ON	OFF	Speed-up/speed-down 2	P09.05、P09.06
ON	ON	Speed-up/speed-down 3	P09.07、P09.08

P05.10	HDI1 terminal function selection	0: HS pulse input 1: switching value input	0	

Set HDI1 terminal input property setup, default is HS pulse input function.

P05.11	Digital input polarity selection	0x000~0x1FF: bit0~bit5 corresponding DI1~DI5, DHI1, DI7, DI8, DI9, the binary set value corresponding function” 0: switch close effective 1: switch open effective	0x00	

Set DI digital input terminal effective state mode

0: when selecting switch close effective, corresponding DI terminal connected with COM or OPEN is effective, open is un-effective;

1: when selecting switch open effective, corresponding DI terminal connected with COM or OPEN is un-effective, open is effective;

P05.12	Digital input DI filter time	0.000s~1.000s	0.010s	

It is used to set the software filter time of DI terminal status. If input terminal is easily interfered or resulting in wrong action in some application, in order to increase anti-interference capacity, the parameter can be increased. But the DI terminal responsing getting slow if filter time increased (HDI1 input function is invalid in HD pulse input)

P05.13	AI1 voltage lower limit value	-10.00V~P05.15	0.00V	
P05.14	Ai1 lower limit corresponding setup	-100.0%~100.0%	0.0%	

P05.15	AI1 voltage upper limit	P05.13~10.00V	10.00V	
P05.16	AI1 upper limit corresponding setup	-100.0%~100.0%	100.0%	
P05.17	AI1 input filter time	0.000s~10.000s	0.100s	

Above function code is used to set the relation of analog AI1 input voltage and its standing setting value

When analog input voltage bigger or smaller than set upper limit(P05.15) or lower limit (P05.13), take the upper limit(P05.15) or lower limit (P05.13) to calculate.

AI input filter time, to set AI1 software filter time, when the on-site analog is easily effected, then increase filter time to make detecting analog signal getting steady. But the filter time is bigger, the analog signal detecting responsing speed is lower. Please consider the actual situation to set.

In different application, analog set 100.0% is different from its corresponding nominal value, please refer to application description. Below diagram is two typical setting situation:

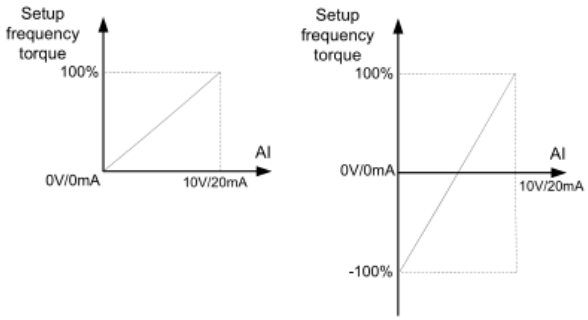


Fig.6-9 Corresponding Relationship between Analog Reference and Setting

P05.18	AI2 input type selection	0: voltage input type 1: current input type	0	
P05.19	AI2 voltage lower limit value	-10.00V~P05.21	0.00V	
P05.20	AI2 voltage lower limit corresponding setup	-100.0%~100.0%	0.0%	
P05.21	AI2 voltage upper limit value	P05.19~10.00V	10.00V	
P05.22	AI2 voltage upper limit corresponding setup	-100.0%~100.0%	100.0%	
P05.23	AI2 current lower limit value	-20.00mA~P05.25	0.00mA	
P05.24	AI2 current lower limit corresponding setup	-100.0%~100.0%	0.0%	
P05.25	AI2 current upper limit value	P05.24~20.00mA	20.00 mA	
P05.26	AI2 current upper limit corresponding setup	-100.0%~100.0%	100.0%	
P05.27	AI2 input filter time	0.000s~10.0000s	0.100s	

The method of setting AI2 function and usage, refer to AI1 description, when analog input is current input, 1mA current is equal to 0.5V voltage, corresponding 20mA current is equal to 10V, as diagram 6.6-6 showed linear relation.

P05.28	AI3 input mode selection	0：Voltage input 1： Current input	0	○
P05.29	AI3 minimum input	-10.00V~P05.31	0.00V	○
P05.30	AI3 minimum input corresponding setup	-100.0%~100.0%	0.0%	○
P05.31	AI3 maximum input	P05.29~10.00V	10.00V	○
P05.32	AI3 maximum input corresponding setup	-100.0%~100.0%	100.0%	○
P05.33	AI3 maximum input	-20.00mA~P05.35	0.00mA	○
P05.34	AI3 maximum input corresponding setup	-100.0%~100.0%	0.0%	○
P05.35	AI3 maximum input	P05.33~20.00mA	20.00mA	○
P05.36	AI3 maximum input corresponding setup	-100.0%~100.0%	100.0%	○
P05.37	AI3 input filter time	0.000s~10.000s	0.100s	○

The method of setting AI3 function and usage, refer to AI1 description, when analog input is current input, 1mA current is equal to 0.5V voltage, corresponding 20mA current is equal to 10V, as diagram 6.6-6 showed linear relation.

P05.39	HS pulse input min frequency	0.00kHz~P05.30	0.00kHz	
P05.40	HS pulse input min frequency corresponding setup	-100.0%~100.0%	0.0%	
P05.41	HS pulse input max frequency	P05.28~100.0kHz	50.00kHz	
P05.42	HS pulse input max frequency corresponding setup	-100.0%~100.0%	100.0%	
P05.43	HS pulse input filter time	0.000s~10.00s	0.00s	

The set of function is used to set the relation of HDI1 pulse frequency and corresponding setup. Pulse frequency only input by HDI1 channel to inverter. The set function is similar to AI1, refer to AI1 description.

P05.44	DI1 terminal close delay time	0.0s~6000.0s	0.0s	
P05.45	DI1 terminal open delay time	0.0s~6000.0s	0.0s	
P05.46	DI2 terminal close delay time	0.0s~6000.0s	0.0s	
P05.47	DI2 terminal open delay time	0.0s~6000.0s	0.0s	
P05.48	DI3 terminal close delay time	0.0s~6000.0s	0.0s	
P05.49	DI3 terminal open delay time	0.0s~6000.0s	0.0s	
P05.50	DI4 terminal close delay time	0.0s~6000.0s	0.0s	
P05.51	DI4 terminal open delay time	0.0s~6000.0s	0.0s	
P05.52	DI5 terminal close delay time	0.0s~6000.0s	0.0s	
P05.5	DI5 terminal open delay	0.0s~6000.0s	0.0	

3	time		s	
P05.54	HDI1 terminal close delay time	0.0s~6000.0s	0.0s	
P05.55	HDI1 terminal open delay time	0.0s~6000.0s	0.0s	
P05.56	DI7 terminal close delay time	0.0s~6000.0s	0.0s	
P05.57	DI7 terminal open delay time	0.0s~6000.0s	0.0s	
P05.58	DI8 terminal close delay time	0.0s~6000.0s	0.0s	
P05.59	DI8 terminal open delay time	0.0s~6000.0s	0.0s	
P05.60	DI9 terminal close delay time	0.0s~6000.0s	0.0s	
P05.61	DI9 terminal open delay time	0.0s~6000.0s	0.0s	

The group function code is used to set the delay time of inverter disposing input signal when the input terminal connecting and disconnecting. HDI1 channel input function is valid only when switch input function P05.10 = 1 delay effective. As following figure:

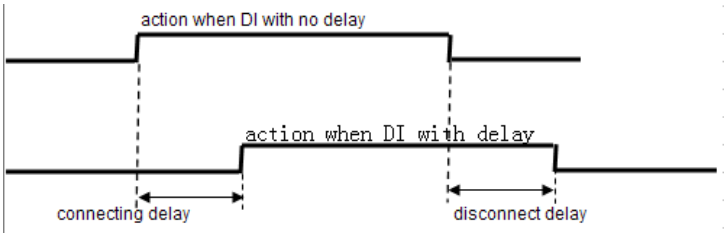


Fig.6.7-7 DI connection delay and disconnection delay diagram

P05.62	Virtual input terminal set selection	0: invalid 1: communication set	0	

This function code is used to set the input terminals in the communication control, whether or not to use communication virtual terminal to control converter. Please refer to the communication protocol in detail. Note: when the input terminals use communication control, can only use all communication virtual terminal control mode.

6.7 P06 Output Terminal function parameter group

P06.00	HD01 terminal output mode selection	0: HD pulse output 1: switching value output	0	

HDO1 terminal is programmable multiplexing terminal. It can be used as high-speed pulse output (HDO), It can also be used as collector open circuit output terminal (DO).

P06.02	Digital output effect logic selection	0x00~0x1F: bit0~bit4 corresponding DO1, HDO1, T1, T2, DO5, binary set value corresponding function:	0	

		0: switch close 1: switch disconnect		

Define output side digital output logic.

0: switch closed, digital output terminal and corresponding mutual terminal connected is valid status, disconnected is invalid status.

1: switch opened, digital output terminal and corresponding mutual terminal connected is invalid status, connected is invalid status.

P06.03	DO1 digit output function selection	0~30, Refer to below table	0	
P06.04	HDO1 digit output function selection		0	
P06.05	Relay T1 digit output function selection		0	
P06.06	Relay T2 digit output function selection		0	
P06.07	DO5 digit output function selection(extension card)		0	

Digit output terminal function table:

Set value	function	Description
0	No output	Output terminal has no function
1	Inverter running	Inverter is in running status, with output frequency(can be zero), at present output ON signal
2	Inverter forward running	Inverter is forward running status, with output frequency, at present output ON signal.
3	Inverter reverse running	Inverter is reverse running status, with output frequency, at present output ON signal.
4	Jog running	Inverter is in jog running status, at present output ON signal.
5	Inverter error	Inverter is in fault and stop with fault, output ON signal.
6	In pre-excitation	When inverter is in pre-excitation, output ON signal
7	Inverter ready for running	When inverter main circuit and control circuit power is steady, and inverter doesn't detect any error message, inverter is in running status, with output ON signal.
8	Overload pre-alarm	Before overload protection action, according to overload pre-alarming valve value to make judgement, if exceeding pre-alarm valve value then output ON signal. Parameter setting refer to function code P13.04,P13.05,P13.08.
9	Off load pre-alarm	Before off load protection action, according to offload pre-alarm valve value to make judgement, when exceeding pre-alarm valve value then output ON signal. Parameter setting refer to function code P13.06,P13.07,P13.08.
10	Frequency level detecting FDT1 output	Refer to function code P09.10, F09.11 description
11	Frequency level detecting FDT2	Refer to function code P09.12, F09.13 description

	output	
12	Zero speed running	inverter is in operation and the output frequency is 0, output ON signal. In stop state the signal is OFF;
13	Frequency arrival	When inverter output frequency enter into set frequency detecting modulation, output ON signal. Please refer toP09.09for details.
14	Upper limit frequency arrival	When running frequency arrival upper limit frequency, output ON signal
15	Lower limit frequency arrival	When running frequency arrival lower limit frequency, output ON signal. In stop status the signal is OFF
16	Set counter value arrival	When counter value arrival P09.27 set value, output ON signal. Counter function refer to P09 group function description
17	designated counter value arrival	When counter value arrival P09.28 set value, output ON signal.
18	Simple PLC stage completed	When after completing a stage of PLC, output a pulse signal with width of 250ms
19	Simple PLC cycle completed	When after completing a cycle of PLC, output a pulse signal with width of 250ms
20	External error valid	When external error signal
21	Accumulate running time arrival	Inverter accumulate running time exceeding P09.30 set time, output ON signal
22	Accumulate power-on time arrival	Inverter accumulate power-on time exceeding P09.31 set time, output ON signal
23	Present running time arrival	Inverter present running time exceeding P09.32 set time, output ON signal
24	Present power-on time arrival	Inverter present power-on time exceeding P09.33 set time, output ON signal
25	Random frequency arrival	When inverter output frequency entering detecting modulation of random set frequency, output ON signal. Refer to function code P09.34, P09.35.
26	Random current arrival	When inverter output frequency entering detecting modulation of random set current, output ON signal. Refer to function code P09.36, P09.37.
27	Current over limit	Inverter output current exceeding set current, refer to function code P13.09~P13.11
28	Communication virtual terminal output	Inverter DO output terminal under communication control, refer to communication protocol.
29	Brake control	Inverter brake output function, refer to function code P09.51~P09.54
30	Stop command output	When inverter is in stop status output ON signal or inverter is running but receiving stop command then instantly output ON

		signal
31	Running(jog running)	Inverter under non-jog running and output ON signal

P06.08	AO1 analog output function	0~25, refer to below table	0	○
P06.09	AO2 analog output function		0	○
P06.10	HDO1 pulse output mode function		0	○

Analog output AO1 and AO2 output range is 0V~10V or 0/4mA~20mA. HDO1 terminal output pulse frequency range is 0.01kHz~P06.01(the output max frequency of HDO1 pulse output mode), P06.01 can be set from 0.01kHz~100.00kHz.

Pulse or analog signal output 0.0%~100.0% corresponding function as below table:

Set value	function	description
0	Running frequency	100.0% corresponding to max output frequency
1	Set frequency	100.0% corresponding to max output frequency
2	Output current 1(relative value)	100.0% corresponding to 2times of motor rate current
3	Output voltage 1(relative value)	100.0% corresponding to 1.5times of motor rate voltage
4	Motor RPM	100.0% corresponding to 2times of motor rate RPM
5	Output power	100.0% corresponding to 2times of motor rate power
6	HS pulse input value	HS pulse HDI input value(100.0% corresponding HDO1 output upper limit)
7	AI1 input value	0.00V~10.00V
8	AI2 input value	0.00V~10.00V (or corresponding 0.00mA~20.00mA)
9	Reserve	
10	Reserve	
11	Counting value	0~max counter value
12	Output torque	100.0% corresponding to 2times of motor rate torque
13	Output current 2(absolute value)	0.0A~1000.0A
14	Output voltage 2(absolute value)	0.0V~1000.0V
15	Slope given frequency	100.0% corresponding to max output frequency
16	Communication set value 1	Correspond to MODBUS communication set value 1
17	Communication set value 2	Correspond to MODBUS communication set value 2

P06.11	AO1 output voltage(current)lower limit	0.00V~P06.13(0.00mA~P06.13)	0.00V	○
P06.12	Corresponding A01 output Voltage(current)lower limit corresponding set value	0.0%~100.0%	0.0%	○
P06.13	AO1 output	P06.14~10.0V(P06.11~20.0	10.00	○

	voltage(current)upper limit	0mA)	V	
P06.14	AO1 output voltage(current)upper limit corresponding set value	0.0%~100.0%	100.0 %	○
P06.15	AO1 output filter time	0.000s~10.000s	0.000 s	○
P06.1	AO2 output voltage(current)lower limit	0.00V~P06.20(0.00mA~P0 6.18)	0.00V	○
P06.17	AO2 output voltage(current)lower limit corresponding set value	0.00%~100.0%	0.0%	○
P06.18	AO2 output voltage(current)upper limit	P06.18~10.00V(P06.16~20 .00mA)	10.00 V	○
P06.19	AO2 output voltage(current)upper limit corresponding set value	0.0%~100.0%	100.0 %	○
P06.20	AO2 output filter time	0.000s~10.000s	0.000 s	○

The function code used to set the relation of analog output voltage and its representing set value.

When AO1, AO2 output is the current output, 1aA current is equal to 0.5V voltage, so 20mA current equal to10V.

When AO1 AO2 output is current output, it is suggested to add a external resistor with less than 500Ω

P06.21	HDO1 output lower limit	0.0%~P06.23	0.0%	○
P06.22	Lower limit corresponding HDO1 output	0.00kHz~100.00kHz	0.0kHz	○
P06.23	HDO1 output upper limit	P06.21~100.0%	100.0 %	○
P06.24	Upper limit corresponding HDO1 output	0.00kHz~100.00kHz	50.00k Hz	○
P06.25	HDO1 output filter time	0.000s~10.000s	0.000s	○

When selecting HDO1 terminals as pulse output, the function code is used to set value between the high-speed pulse output and its representative set value.

P06.26	DO1 terminal close delay	0.0s~6000.0s	0.0 s	○
P06.27	DO1 terminal open delay	0.0s~6000.0s	0.0 s	○
P06.28	HDO1 terminal close delay	0.0s~6000.0s	0.0 s	○
P06.29	HDO1 terminal open delay	0.0s~6000.0s	0.0 s	○
P06.30	Relay T1 close delay	0.0s~6000.0s	0.0 s	○
P06.31	Relay T1 open delay	0.0s~6000.0s	0.0 s	○

P06.32	Relay T2 close delay	0.0s~6000.0s	0.0 s	O
P06.33	Relay T2 open delay	0.0s~6000.0s	0.0 s	O
P06.34	DO5 terminal close delay	0.0s~6000.0s	0.0 s	O
P06.35	DO5 terminal open delay	0.0s~6000.0s	0.0 s	O

Set output terminal DO1 HDO1 Relay T1 Relay T2 delay time from status change to actual output change. As below diagram:

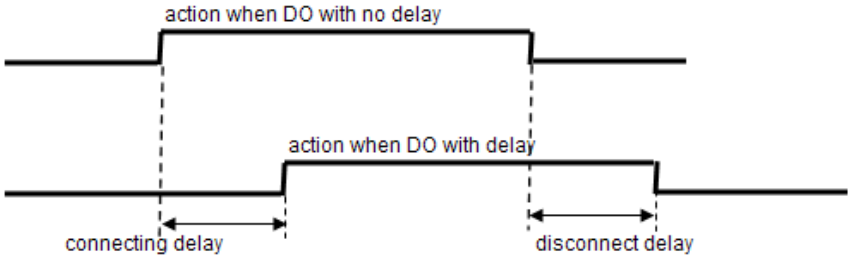


Fig. 6.7-1 DO connected delay and open delay diagram

6.8 P08 Process PID Control Parameter Function

Process PID close loop control is in control system adopting proportion(P), integration(I), Differential(D) 3 part composed regulator, a control method to make feedback value and command value deviation to gradually decrease. It is applicable in flow, pressure, temperature etc process control.

Proportional control (P): a control quantity in proportion with deviation

Integration Control (I): a control quantity in proportion with deviation integral value

Differential control (D): a control quantity in proportion with deviation change ratio, can forecast deviation change tendency, quick response to violate changes, improve dynamic performance. But is easily to introduce and amplify interference signal and resulting system unsteady, please consider carefully.

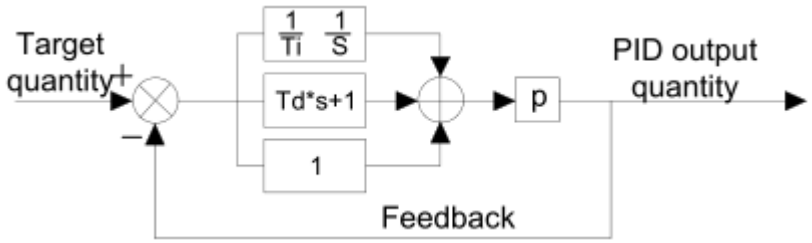


Fig 6.8-1 PID Control Principle Framework

P08.00	PID command source	0: function code P08.01 1: AI1 2: AI2 3: AI3(extention card) 4: HS pulse input 5: MS speed command	0	O

		6: communication given 7: keypad potentiometer		

Set PID command source, when selecting manufacturer default 0, it is using keypad set PID target given value. The setup target value of the process PID is relative value, and the setup 100% is relative to full range of feedback signal of the controlled system. The system will always calculate according to the relative value (0 to 100%).

Note: When command source selecting PID output (P00.02 or P00.03 set as 8) then process PID control is effective.

P08.01	PID command keypad set value	0.0%~100.00s	50.0%	○

When PID command source selecting function code P08.01 setup, PID control command value is the set value of its function code.

P08.02	PID command up/down time	0.00s~100.00s	0.00s	○

Set PID command UP/DOWN time, the soft start function is to set UP/DOWN time to increase/decrease PID command value in PID control. The set time is the time required from 0.0% command increasing to 100.0% command, or from 100.0% command decreasing to 0.0% command.

P08.03	PID feedback source	0: AI1 1: AI2 2: AI3 (extention card) 4: AI1+AI2 5: MAX (AI1, AI2) 6: MIN (AI1, AI2) 7: HS pulse input 8: communication given	0	○

Set feedback source of PID close loop control, feedback input channel must be external input and cannot share the same channel with PID given channel. Otherwise it result PID control invalid.

P08.04	PID output feature selection	0: PID output positive feature 1: PID output negative feature	0	O

PID output positive feature: When PID feedback is smaller than the PID command, deviation is positive, it needs to increase inverter output frequency to balance the PID.

PID output negative feature: When PID feedback is higher than the PID command, deviation is positive, it needs to reduce inverter output frequency to balance the PID.

The function code and DI function(the reverse of PID action direction) do EO logic as the actual PID action direction.

P08.05	PID feedback display factor	0.00~655.35(user self-define unit)	1.00	○

PID feedback display factor: PID command value 100% (feedback meter full range) corresponding physical quantity in PID control system. Such as constant pressure water supply system, the pressure meter full range 30.0MPa, the PID feedback display factor set as 30.0, at this stage the status display function code PID setup P31.17 PID feedback P31.18 corresponding value unit is the physical unit of 0.1MPa in P31 group.

P08.06	PID proportional gain 1	0.00~100.00	1.00	○
P08.07	PID integration time 1	0.01s~10.00s	0.10s	○
P08.08	PID differential time 1	0.00s~10.00s	0.00s	○
P08.09	PID proportional gain 2	0.00~100.00	1.00	○
P08.10	PID integration time 2	0.01s~10.00s	0.10s	○
P08.11	PID differential time 2	0.00s~10.00s	0.00s	○

In order to meet process PID control in complicate control application, the inverter has built-in 2groups separate PID control parameter.

Proportional gain Kp: It decides the adjustment intensity of the whole PID regulator. The higher the P is, more powerful the adjustment intensity is. When this parameter is 100, indicating the deviation between PID feedback quantity and the reference quantity is 100%, the adjustment amplitude of the PID regulator on the output frequency command is maximum frequency (the integral and differential functions are neglected).

Integration time Ti: It decides the PID regulator integration adjusting speed of the deviation which between the PID feedback quantity and the reference quantity. Integration time is the time within which the integration regulator (the proportional and differential functions are neglected) performs continuous adjustment and the adjustment quantity reaches maximum frequency (P00.07) when the deviation between the PID feedback quantity and reference quantity is 100%. The shorter the integration time is, more powerful the adjustment intensity is.

Differential time Td: It decides the intensity of PID regulator adjusting the change rate of deviation between the PID feedback quantity and the reference quantity. Differential time is the time within which if the feedback quantity changes 100%, the adjustment quantity reaches maximum frequency (P00.07) (proportional and integral functions are neglected). The longer the differential time is, more powerful the adjustment intensity is.

P08.12	PID parameter switch condition	0: no switch(only use PID parameter 1) 1: DI terminal 2: according to deviation auto switch	0	○
P08.13	PID parameter switch deviation 1	0.0%~100.0%	20.0%	○
P08.14	PID parameter switch deviation 2	0.0%~100.0%	80.0%	○

2 set of independent PID control parameters can be set by P08.12 as not-switch, DI terminal or automatic-switch.

If you choose to PID parameters automatically switches, when a given and feedback error absolute value is less than the PID parameters switch deviation 1 P08.13 setting, the PID control parameters selected PID parameter 1;

When a given and feedback error absolute value is bigger than the PID parameters of deviation 2 P08.14 setting, the PID control parameters selected PID 2; When a given and feedback error absolute value in PID switch deviation 1 and PID deviation between 2, PID control parameters is linear interpolation of two groups of PID control parameters values. As shown in the figure below.

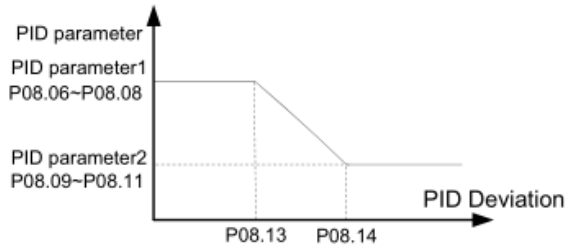


Fig 6.8-2 Schematic diagram for PID parameters automatically switch

P08.15	PID deviation limit	0.0%~100.0%	0.0 %	

When the deviation of PID command and feedback is smaller than function code set value, PID regulator stop regulation, PID output maintains with no change, for some application it can increase PID regulator stability.

The corresponding relation of Deviation limit and output frequency as below diagram:

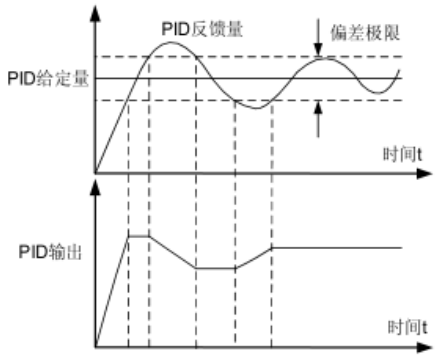


Fig. 6.8-3 PID deviation limit diagram

P08.16	PID preset output mode	0: disable preset output 1: output according to retention time 2: output when PID feedback<switching threshold 3: output when PID feedback>switching threshold	0	○
P08.17	PID preset output value	0.0%~100.0% (as frequency command relative to max output frequency)	10.0%	○
P08.18	PID preset output value retention time	0.00s~600.00s	0.50s	○
P08.19	PID preset output switching threshold	0.0%~100.0%(relative to PID command value)	50.0%	○

When P08.16 set to non-0, namely enable PID preset mode. Appropriate setting preset frequency preset holding time of PID preset frequency, or preset output switching threshold, to avoid the inverter start initial feedback and command deviation limits and make the PID regulator saturation, can make the closed-loop regulating quickly into a stable stage and no obvious overshoot or oscillation.

After the PID running, frequency accelerate to PID preset point according to speed-up time, and will keep running at the frequency point until it doesn't meet the PID preset output retention condition as in P08.16 set, then running according to PID regulator output. As below diagram P08.16 set as 1:

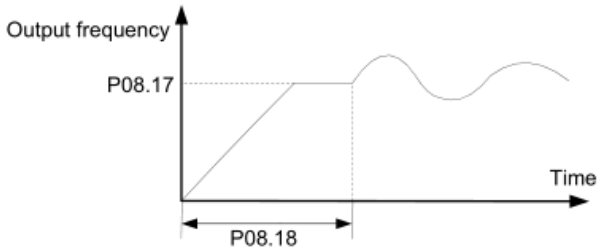


Fig 6.8-4 Schematic diagram if PID preset output

P08.20	Feedback breakline detecting value	0.0%: no detecting 0.1%~100.0%	0.0%	○
P08.21	Feedback breakline detecting time	0.0s~20.0s	0.0s	○

If P08.20 set to a non-zero value, when the feedback signal is less than P08.20 set detecting value but exceeding

P08.21 setting time, it decided the PID feedback break line, system will quote the PID feedback break line breakdown (Er023).

P08.22	Feedback exceeding detecting value	0.0%~100.0%	0.0%	○
P08.23	Feedback exceeding detecting time	0.0s~20.0s	0.0s	○

when the feedback signal is bigg than P08.22 set detecting value but exceeding P08.23 setting time, it decided the PID feedback exceeding limit, system will quote the PID feedback exceeding limit breakdown (Er022).

P08.24	PID dormant threshold	P08.25~100.0%(relative to PID range 100%: cancel dormant function	100.0%	○
P08.25	PID revive threshold	0.0%~P08.24(PID feedback range)	0.0%	○
P08.26	PID dormant waiting time	0.0s~6000.0s	1.0s	○
P08.27	PID revive waiting time	0.0s~6000.0s	0.5s	○

PID dormancy: when the system detects that the PID feedback value higher than PID dormancy threshold and retention time exceeding PID dormant waiting time , inverter will start decelerate according to the time set by the speed-down time, and later enter into a dormant state when frequency drop to zero. If in the above process PID feedback below the PID dormancy threshold, PID return back to regulating state, dormancy wait counting clear up. When this parameter is set to 100%, the PID dormancy function is invalid.

PID awakening: when inverter is in PID dormant state, once if PID feedback below the PID revive threshold and maintain time longer than PID revive waiting time, inverter will quite dormant state and return back to PID regulating mode.

P08.28	PID calculation method	0: stop but no calculation 1: stop with calculation	0	○

Used to decide whether to continue the PID arithmetic when inverter is in stop status. General applications, in stop state inverter should stop PID calculation. The stop operation selection might be useful in constant pressure water supply system and other special occasions.

P08.29	PID output positive max value	0.0%~100.0%	0.0 %	○
P08.30	PID output negative max value	0.0%~100.0%	0.0 %	○

PID output positive, negative max value, used to limit PID output modulation.

P08.31	PID feedforward source selection	0: no feedforward source 1: AI1 2: AI2 3: AI3(extention card) 4: HS pulse input 5: communication set	0	○

In PID closed-loop control, the feed forward source is added to the PID control output, to improve the stability of the control system. Feed forward control scheme is applied to a system which require high linear velocity synchronization and quick response speed, such as wire drawing machine applications.

P08.32	PID feed forward gain	0.000~60.000	1.000	○

PID forward gain: the parameter is used to set feed forward source proportion relation.

P08.33	PID output positive max variation	0.0%: no limit 0.1%~100.0%	0.00 %	○
P08.34	PID output negative max variation	0.0%: no limit 0.1%~100.0%	0.00 %	○

Operation of the inverter PID control, the parameter is used to set the variation ratio of PID actual output .

P08.35	PID sampling cycle	0.000s~100.0000s	0.100 s	○

Refers to sampling cycle of feedback quantity, the PID regulator calculate one time in each sampling cycle operation. The greater the sampling period the slower response speed.

P08.36	PID regulating selection	0: arrive upper/lower limit and continue	1	○

		integration 1: arrive upper/lower limit and stop integration		

When PID control operation using integration function to decide whether to continue integration when set upper/lower limit arrived.

Reach the upper and lower limit continue to integral: integral quantity has real-time response to the changes between given quantity and feedback quantity, unless the internal integral limit has been reached. When the difference between given quantity and feedback quantity changes, it takes longer time to offset continuous integration effect, so integration will follow the changing tendency.

Reaching the upper and lower limit to stop integration: the integrating quantity remains with no change, when the difference changing tendency between given quantity and feedback quantity varies, integration will quickly follow the tendency.

P08.37				○

Set

P08.38				◎

PID

P08.39				○

Set

P08.32	PID feed forward gain	0.000~60.000	1.000	○

When

6.9 P09 Special Function Parameter Group

P09.00	Jog running frequency	0.00Hz~P00.07(max output frequency)	5.00 Hz	○
P09.01	Jog running speed-up time	0.0s~3600.00s	Model setting	○
P09.02	Jog running speed-down time	0.0s~3600.00s	Model setting	○

Target frequency and speed-up/down time when setting jog operation, speed-up/down time is the time needed when speeding up to P00.16 selected reference frequency.

Note: the start frequency is neglected when jogging, DC brake devices, from 0 frequency to accelerate, decelerate to 0 frequency then stop running.

P09.03	Speed-up time 1	0.0s~3600.0s	Model setting	○
P09.04	Speed-down time 1	0.0s~3600.0s	Model setting	○
P09.05	Speed-up time 2	0.0s~3600.0s	Model setting	○
P09.06	Speed-down time 2	0.0s~3600.0s	Model setting	○
P09.07	Speed-up time 3	0.0s~3600.0s	Model setting	○
P09.08	Speed-down time 3	0.0s~3600.0s	Model setting	○

Acceleration/deceleration time refers to the time needed that frequency from 0.00 Hz speed-up/down to the reference frequency (P00.16), which is used to set frequency changing

slope.

There Provide 4 groups of speed-up/down time for selection, through digital input terminal to choose parameters (refer to P05 parameter group). If there is no terminal input option to speed-up/down, then terminal selection is invalid, so speed-up/down time is group 0 accordingly.

P09.09	Set frequency arriving detecting modulation	0.00Hz~P00.07 (max output frequency)	0.00Hz	○

When the output frequency is within positive/negative detecting range of preset frequency, DO output terminal output ON signal (the DO terminal has to set “set frequency arrival function). As below diagram (take MS speed set frequency to illustrate.):

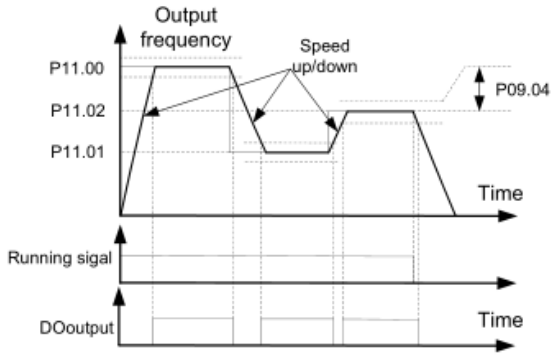


Fig 6.9-1 Diagram of Setting frequency arriving detecting amplitude

P09.10	Frequency detecting value 1(FDT1)	0.00Hz~P00.07 (max output frequency)	50.00 Hz	○
P09.11	Frequency detecting 1 lagged value	-100.0%~100.0% (relative to FDT1)	5.0%	○
P09.12	Frequency detecting value 2(FDT2)	0.00Hz~P00.07 (max output frequency)	50.00 Hz	○
P09.13	Frequency detecting 2 lagged value	-100.0%~100.0% (relative to FDT2)	5.0%	○

Frequency detection FDT function: when the output frequency exceeds set frequency detecting value, DO indicating signal FDT output is valid, until the output frequency drop below detecting value and the difference value exceeding the lagged value, DO indicating signal FDT output is invalid. On the max extent to permit setting 2 FDT detecting points at the same time.

FDT lag amplitude = FDT detecting value* FDT lag value

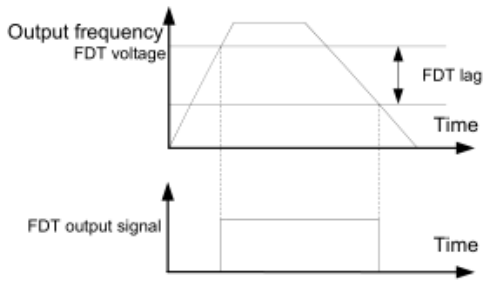


Fig 6.9-2 FDT signal diagram

P09.14	Swing frequency set mode	0: relative to central frequency 1: relative to max frequency(reserve)	0	●

P09.15	Swing frequency amplitude	0.0%: close swing frequency function 0.1%~100.0%	0.0%	○
P09.16	Jump frequency amplitude	0.0%~50.0%	0.0%	○
P09.17	Swing frequency rising time	0.0s~3000.0s	5.0s	○
P09.18	Swing frequency droping time	0.0s~3000.0s	5.0s	○

The swing frequency function is applicable to the textile and chemical fiber fields and the applications where traversing and winding functions are required.

The swing frequency function means that the output frequency of the inverter swings up and down arounding the central of setting frequency. The trace of running frequency at the time axis is shown in the figure below, of which the swing amplitude is set by P09.15. When P09.15 is set to 1, indicating the swing amplitude is 0, the swing frequency is disabled.

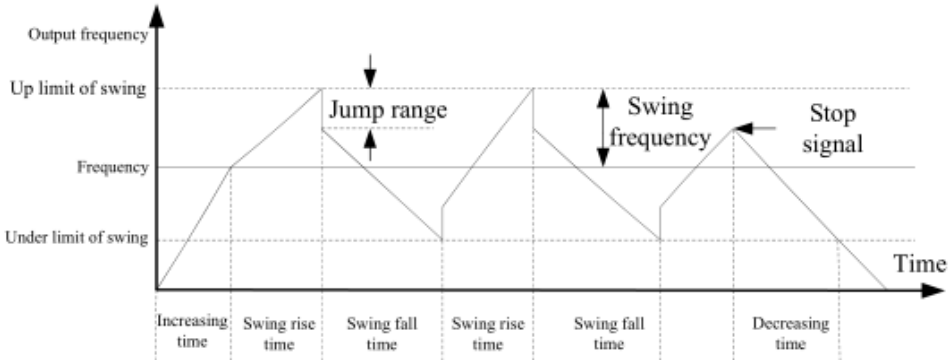


Fig 6.9-3 Schematic diagram for swing frequency work principle

Swing frequency set method is used to set swing amplitude reference quantity.

For central frequency (present setting frequency) is relative to variable swing system. Swing amplitude changes according to central frequency changing.

Relative to max frequency is fixed swing amplitude system, the swing amplitude is fixed.

Swing amplitude: the frequency is restraint by upper/lower limit frequency.

Swing amplitude relative to central frequency: swing amplitude AW=central frequency*swing amplitude P09.15

Swing amplitude relative to max frequency: swing amplitude AW=max frequency*swing amplitude P09.15

Swing amplitude relative percentage set by Jump frequency amplitude P09.16, actual jump amplitude=swing amplitude AW*jump frequency amplitude P09.16

Swing frequency rising time: the time needed running from the lowest point of swing frequency to the highest point.

Swing frequency falling time: the time needed falling from the highest point of swing frequency to the lowest point.

P09.19	Jump frequency 1	0.00Hz~P00.07(max output frequency)	0.00Hz	○
P09.20	Jump frequency amplitude 1	0.00Hz~P00.07(max output frequency)	0.00Hz	○

P09.21	Jump frequency 2	0.00Hz~P00.07(max output frequency)	0.00Hz	○
P09.22	Jump frequency amplitude 2	0.00Hz~P00.07(max output frequency)	0.00Hz	○
P09.23	Jump frequency 3	0.00Hz~P00.07(max output frequency)	0.00Hz	○
P09.24	Jump frequency amplitude 3	0.00Hz~P00.07(max output frequency)	0.00Hz	○

Swing frequency cycle: the sum of swing amplitude rising time and swing amplitude falling time

Jump frequency is that when target frequency fall within jump frequency range, actual running frequency will automatically adjust out of the jump frequency range to avoid mechanic resonance frequency point. As below diagram showed, actual running frequency fall onto the solid line:

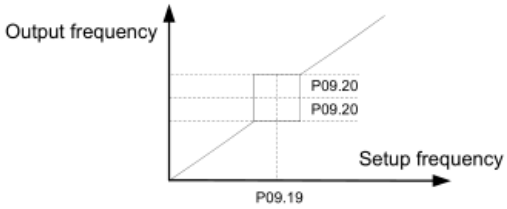


Fig6.9-4 Schematic diagram for Jump frequency

P09.27	Set counter value	P09.28~65535	1000	○
P09.28	Designated counter value	1~P09.27	500	○

The counting value can set counter input DI function. When counting value arrive at set counter value, digial output terminal output signal set by counter and counter stop counting. When the counting value reaches the designated counting value, the digital output terminal will output signal of designated counting value. The counter will continue counting till the “setup counting value” is reached. The designated counting value shall not exceed the setup counting value.

Counter input DI function recommend using HS DI (HDI) terminal receipt, if input signal frequency is low (<500Hz), can also use general DI terminal.

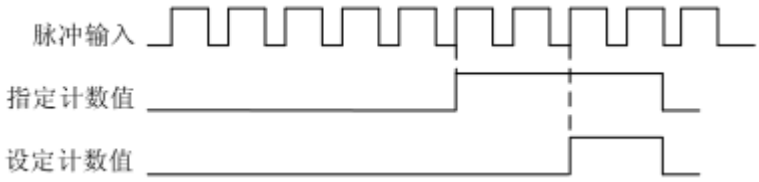


Fig 6.9-5 Diagram of setup counting value and designated counting value

P09.29	Sagging control frequency drop ratio	0.00Hz~10.00Hz	0.00Hz	○

This parameter adjust the inverter frequency change ratio of speed sagging. When several units of inverter drive the same load at the same time, due to speed variation resulting in load distribution unbalance, the inverter with higher speed will bear heavier load. The sagging control function can make speed sagging following the load increasing so to balance the load distribution.

P09.30	Accumulate running arrival time set	0h~65535h	0h	○

P09.31	Accumulate power-on arrival time set	0h~65535h	0h	○
P09.32	Present running arrival time set	0min~65535 min	0min	○
P09.33	Present power-on arrival time set	0min~65535 min	0min	○

The function code is used to set their own time of arrival, when the setting time, digital output terminals output corresponding DO signals (21 ~ 24 function).

P09.34	Random arrival frequency	0.00Hz~10.00Hz	0.00Hz	○
P09.35	Random arrival frequency detecting amplitude			○

When output frequency is within the positive/negative detecting width range of random setup frequency, DO output terminal output ON signal (the DO terminal has to be set as “random arrival frequency function”). As below diagram:

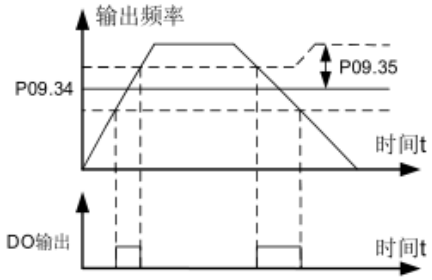


Fig 6.9-6 random arrival frequency detecting diagram

P09.36	Random arrival current	0.0%~300.0%	0.0%	○
P09.37	Random arrival current detecting amplitude	0.0%~P09.36	0.0%	○

When output frequency is within positive/negative detecting width range of random setup current, DO output terminal output ON signal (the DO terminal has to be set as “random arrival current function”). As below diagram:

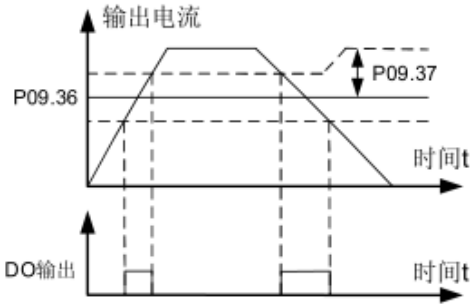


Fig 6.9-7 Random arrival current detecting diagram

P09.38	Electricity consumption initial value high bit	0kwh~60000 kwh	0kwh	○
P09.39	Electricity consumption initial value low bit	0.0wh~999.9 wh	00wh	○

Used to set electricity consumption initial value. Electricity consumption initial value = P09.38*1000+P09.39(wh).

P09.40	Inverter input power factor	0.00~1.00	0.86	○

Used to adjust AC input side current display value

P09.41	Keypad ^/v fine tuning frequency & JOG/REV quick frequency setup	0x0000~0x1221 LED the unit bit: frequency control selection 0: adjusting valid 1: adjusting invalid LED the decade bit: frequency control selection 0: only P00.02=1 or P00.03=1 valid 1: all frequency mode all valid 2: MS speed in priority, invalid for MS speed LED the hundred bit: action selection when stop 0: setup valid 1: valid in running, clear after stop 2: valid in running, clear after receipt of stop command LED the thousand bit: v/^ key integration function 0: integration function valid 1: integration function invalid	0x0000	○

Used to set inverter keypad v/^ key function selection.

P09.42	v/^ key integration rate	0.01s~10.0s	1.0s	○

If select v/^ key integration function valid, the parameter is used to set v/^ key integration rate value, the bigger the value is, the smaller the change rate is.

P09.43	UP/DOWN terminal control set	0x000~0x221 LED the unit bit: frequency control selection 0: UP/DOWN terminal set valid 1: UP/DOWN terminal set invalid LED the decade bit: frequency control selection 0: only valid when P00.02=1 or P00.03=1 1: all frequency mode is valid 2: MS speed in priority, invalid for MS speed LED the hundred: action selection when stop 0: set valid 1: valid in running, clear after stop 2: valid in running, clear after receipt of stop command	0x000	○

Used to set terminal UP/DOWN function selection

P09.44	UP/DOWN terminal frequency change rate	0.01Hz/s~50.0Hz/s	1.00Hz/s	○

If choosing terminals UP/DOWN function, set the parameters used in the terminal UP/DOWN the size of the function change rate, the greater the value, the greater the rate of change.

P09.45	Frequency setup power off Action selection	0x000~0x111 LED the unit bit: action selection when digit tuning frequency Power off 0: save when power off 1: clear when power off LED the decade bit: action selection when MODBUS setting frequency 0: save when power off 1: clear when power off LED the hundred bit: action selection when other communication setting frequency 0: save when power off 1: clear when power off	0x000	○

P09.46	PWM selection	0x00~0x21 LED the unit bit: PWM mode selection 0: PWM mode 1, 3phase modulation and 2phase modulation 1: PWM mode 2, 3phase modulation LED the decade bit: PWM low speed carrier mode 1 0: low speed carrier limit, carrier limit mode 1 1: low speed carrier limit, carrier limit mode 2 2: low speed carrier no limit	0x01	◎

Used to

P09.47	0 frequency output selection	0: no voltage output 1: with voltage output 2: output according to stop DC brake current	0	○

Used to set the output of the inverter at zero frequency output mode selection. Such as system at zero frequency runtime motor need to keep a certain tension and torque in order to maintain system can set the appropriate parameters to achieve purpose.

P09.48	Action after accumulate power-on and running time	0: output terminal action, alarming error 1: output terminal action, no alarming error	0	○

Used to set whether inverter will alarm when the accumulated power-on and running time arrive.

Output terminal action, error alarming: the inverter output DO action and meanwhile alarming Er027(if running time arrived) or alarming Er08(power-on time arrival) and instantly stop.

Output terminal action, no alarming fault: the inverter only output DO action, such as running signal effectively, will continue to keep running status.

P09.49	Motor power factor correction	0.00%~200.0%	100.0%	○

Used to correct motor power factor

P09.50	Self define error selection	0: running prohibit upon error 1: jog running upon error	0	○

Used to set inverter disposal method after receiving user defined error input signal.

P09.51	Brake release frequency	0.00Hz~P00.07(max output frequency)	0.00 Hz	○
P09.52	Brake release current	0.0%~200.0%(100% corresponding with motor rate current)	0.0%	○
P09.53	Brake clasp frequency	0.00Hz~P00.07(max output frequency)	0.00 Hz	○
P09.54	Brake clasp current	0.0%~200.0%(100% corresponding with motor rate current)	0.0%	○

This group of function code is application required inverter output brake release, brake clasp.

P09.51, P09.52 is used to set the frequency and current of detecting brake release. The relation Between P09.51(brake release frequency parameter) and P09.52 (brake clasp current parameter) is AND,

That is only two parameter meeting the inverter output requirement then brake release acted.

P09.53,P09.54 is used to detect the frequency and current when recovering brake clasp. The relation between P09.53 P09.54 is OR, so one of the two meeting the setting value will output and recovering brake clasp action. As shown in the figure below:

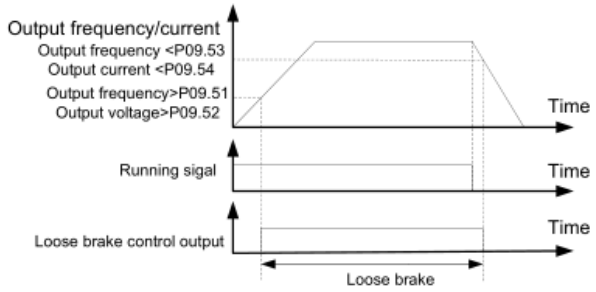


Fig 6.9-8 Diagram for brake release and brake clasp

6.10 P10 Keyboard and Display

P10.00	STOP/RESET key stop function	0: only valid for control panel 1: valid for control panel and terminal control 2: valid for control panel and communication control 3: valid for all control mode	0	○

This parameter is used to set STOP/RESET key function selection.

RESET function is always valid, no matter what value is set for the parameter.

P10.01	JOG/REV key function	0: no function 1: jog running 2: forward reverse swiching 3: random stop 4: clear UP/DOWN and v/^ key setting frequency 5: shift key switch displaying status 6: realize running command given mode and switch according to sequence 7: quick adjusting mode(according to non-manufacturer parameter) 8: quick revise setting frequency	1	◎

This parameter is used to set JOG/REV button function selection

P10.02	JOG/REV key running command channel switching sequence selection	0: keypad control ←→terminal control 1： keyboard control←→Communication control 2： terminal control ←→Communication control 3: keyboard control→terminal control→ Communication control	3	○

When P10.01 set as 6,this parameter is used to set JOG/REV button function selection.

P10.03	Operating display parameter low bit	0x0000~0xFFFF BIT0: （Hz ON）Operation frequency BIT1: （Hz ON）Setting frequency BIT2: （V ON）Bus voltage BIT3: （V ON）Output voltage BIT4: (A ON) Output current BIT5: (rmp ON) running speed BIT6: (% ON) Output power BIT7: (% ON) Output torque BIT8: (% flash) PID setting value BIT9: (% ON) PID feedback BIT10: Input terminal state BIT11: output terminal state BIT12: Torque setup value (% on) BIT13: Pulse counter value BIT14: PLC and MS speed present stage BIT15: Slope frequency setting value（Hz ON）	0x003F	○
P10.04	Operating display parameter high bit	0x0000~0xFFFF BIT0: analog AI1 value（V ON） BIT1: analog AI2 value（VON） BIT2: analog AI3 value（VON） BIT3: HS pulse HDI frequency BIT4: Motor overload percentage（% ON）	0X0000	○

		BIT5: Inverter overload percentage（% ON） BIT6: linear speed BIT7: excitation current（A on） BIT8: Torque current（A on） BIT9: AC line-in Current（A on） BIT10~15: Reserved		

Inverter in running condition, parameter display is subjected to the function code, which is a 16 bit binary number, if one bit is 1, the corresponding parameters of the bit can be run in, can see through the shift key. If the bit is 0, then the corresponding parameters will not be displayed. The lower the bit is, the higher the display priority is.

comparison table of operating display low bit P10.03		comparison table of operating display low bit P10.04	
corresponding display parameter	hexadecimal	corresponding display parameter	hexadecimal
Running frequency（Hz ON）	0x0001	AI1 Voltage（V ON）	0x0001
Setting frequency（Hz flash）	0x0002	AI2 Voltage（V ON）	0x0002
Bus voltage（V on）	0x0004	analog AI3 value(extention card)（V on）	0x0004
Output voltage（V ON）	0x0008	HS pulse HDI frequency	0x0008
Output current（A ON）	0x0010	Motor overload percentage（% ON）	0x0010
Motor rotating speed（RPM ON）	0x0020	Inverter overload percentage（% ON）	0x0020
Output power（% ON）	0x0040	linear speed	0x0040
Output torque（% ON）	0x0080	excitation current (A on)	0x0080
PID setting value（% flash）	0x0100	Torque current（A on）	0x0100
PID feedback value（% ON）	0x0200	AC line-in current (A on)	0x0200
Input terminal state	0x0400		
Output terminal state	0x0800		
Torque setting value（% ON）	0x1000		
Pulse counting value	0x2000		
PLC & MS speed present stage	0x4000		
Slope frequency setting value（Hz ON）	0x8000		

Example 1: for example while runtime only need to display motor rotating speed, other parameters do not need to be displayed.

Motor rotating speed display is at lower bit P10.03, corresponding hexadecimal 0x0020, running display high bit parameter is 0, then set P10.03=0*0020, P10.04=0x0000.

Example 2: such as constant pressure water supply system only need to display the real-time pressure value,

which shows the inverter PID feedback, other parameters do not need to display. PID feedback in shown at low bit P10.03 which corresponding hexadecimal 0x0200, running shown high bit is all 0, and set P10.03 = 0 x0200, P10.04 x0000 = 0.

Note: if the runtime need to display the pressure unit, it must be properly set P08.05 parameters.

Example 3: such as the need to display the operation of the inverter frequency and the output current and other parameters are not displayed. Inverter output frequency is in the running showed low P10.03, corresponding to the hex 0 x0001; Inverter output current is in the running showed low P10.03, corresponding to the hex 0 x0010; This set P10.03 = 0 x0001 + 0 x0010 = 0 x0011, P10.04 x0000 = 0. At this time to shift by pressing the shift key until the operation of the need to look at the inverter frequency and the output current.

P10.05	Stop display	0x0000~0xFFFF BIT0: Frequency setting（Hz flash） BIT1: Bus voltage（V on）	0x0003	○

		BIT2: Input terminal state BIT3: output terminal state BIT4: PID setting value（% flash） BIT5: PID feedback value（% ON） BIT6: Torque setting value（% ON） BIT7: analog AI1 value（V on） BIT8: analog AI2 value（V on） BIT9: analog AI3 value (extention card)（V on） BIT10: HS pulse HDI frequency BIT11: PLC and MS speed present stage BIT12: Pulse counting value BIT13~BIT15: Reserved		

Inverter in stop state, the parameters according to the function code, which is a 16 bit binary number,

if one is 1, then the corresponding parameters can be in when stop, can see through the shift key. If the bit is 0, then the corresponding parameters will not be displayed. The lower bits, the higher the show permissions. Please refer to the operation display parameters detailed setting method.

Stop display parameter P10.05 corresponding table	
Corresponding display parameter	Hexadecimal
Setting frequency (Hz on)	0x0001
Bus voltage (V on)	0x0002
Input terminal state	0x0004
Output terminal state	0x0008
PID given value (% flash)	0x0010
PID feedback value (% on)	0x0020
Torque setting value (% on)	0x0040
Analog AI1 value (V on)	0x0080
Analog AI2 value (V on)	0x0100
Analog AI3 value (extention card) (V on)	0x0200
HS pulse HDI frequency	0x0400
PLC & MS speed present stage	0x0800
Pulse counting value	0x1000

P10.06	Frequency display factor	0.00~60.00 Display frequency=running frequency*P10.06	1.00	○

Used to correct the frequency display factor, . After the user change the Setting frequency display factor,,

inverter LED displayed actual frequency =running frequency * P10.06.

P10.07	RPM speed display	0.00~60.00	1.00	○

	factor	Load speed=RPM*P10.07		

For correction of the coefficient of load speed display. After user changing the Settings rotational speed factor values, inverter LED actual display load speed = RPM* P10.07.

P10.08	Linear velocity display factor	0.00~60.00 Linear speed=mechanic speed*P10.08	1.0 0	O

For correction of the coefficient of load velocity. After user changing the setting of linear velocity coefficient

value, inverter LED will display the actual linear velocity = mechanic speed* P10.08.

6.11 P11 MS Speed Function and Simple PLC Function

MS frequency given as frequency mode is applied in MS speed running mode and simple PLC running mode. When frequency source command A or B is selected as MS speed command, inverter running frequency is MS speed mode.

P11.00	MS speed command 0	-100.0%~100.0%	0.0%	O
P11.01	MS speed command 1	-100.0%~100.0%	0.0%	O
P11.02	MS speed command 2	-100.0%~100.0%	0.0%	O
P11.03	MS speed command 3	-100.0%~100.0%	0.0%	O
P11.04	MS speed command 4	-100.0%~100.0%	0.0%	O
P11.05	MS speed command 5	-100.0%~100.0%	0.0%	O
P11.06	MS speed command 6	-100.0%~100.0%	0.0%	O
P11.07	MS speed command 7	-100.0%~100.0%	0.0%	O
P11.08	MS speed command 8	-100.0%~100.0%	0.0%	O
P11.09	MS speed command 9	-100.0%~100.0%	0.0%	O
P11.10	MS speed command 10	-100.0%~100.0%	0.0%	O
P11.11	MS speed command 11	-100.0%~100.0%	0.0%	O
P11.12	MS speed command 12	-100.0%~100.0%	0.0%	O
P11.13	MS speed command 13	-100.0%~100.0%	0.0%	O
P11.14	MS speed command 14	-100.0%~100.0%	0.0%	O
P11.15	MS speed command 15	-100.0%~100.0%	0.0%	O

MS speed command 100.0% is corresponding max output frequency P00.07, minus sign stand for reverse running. The inverter can set 16stage speed, selected by combined code via external terminal DIin1, DIin2, DIin3, DIin4, separately corresponding to MS speed 0 to MS speed 15.

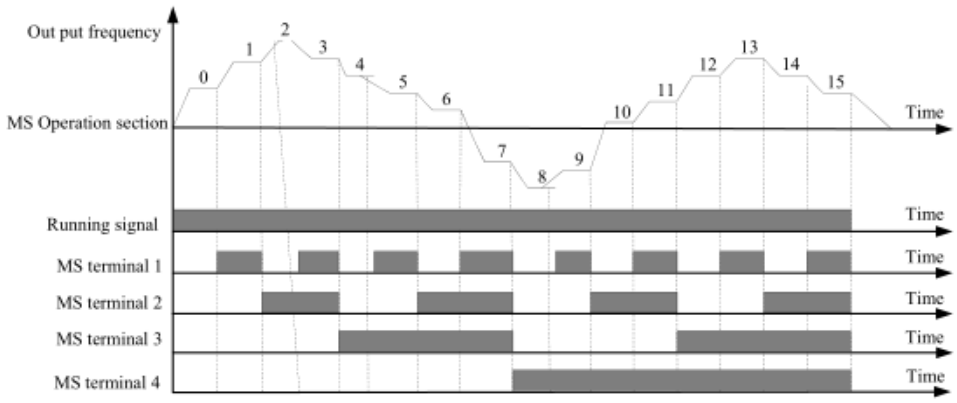


Fig 6.11-1 Multistage speed operation schematic diagram

As shown in the above, when only need 2 stages of speed then one input terminal is required, by

the same token, when there need 3~4 stages of speed then two input terminals are required, and when there need 5 ~ 8 stages of speed then three input terminal are required, and when there need 9~16 stages of speed then 4 input terminal are required.

16 stage speed operating logic diagram DIn1 = DIn2 = DIn3 = DIn4 = OFF, the frequency setup mode of multistage speed command 0 is set by the code P00.12. DIn1 = DIn2 = DIn3 = DIn4 terminal is not all OFF, multistage speed operating, the priority of the multistage speed is higher than the keyboard, PLC, HS pulse, analog quantity, communication frequency input, via DIn1, DIn2, DIn3, DIn4 combined coding, there is 16stage speed to be chosen on max extent.
The start/stop of MS speed operating is also decided by P00.01, the relation between DIn1, DIn2, DIn3, DIn4 terminals and multistage speed is shown in the following table.

DIn1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
DIn2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
DIn3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
DIn4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

WARNING

● the MS speed command priority is the highest in all frequency command sources, when the multistage speed arbitrary terminals function is valid, multistage speed command is preferred.

P11.16	Simple PLC	0: running one time then stop 1: keep the final value running after running one time 2: cycle running	0	○

The parameter is used to set PLC cycle running mode.
Stop after completion of one cycle:
The inverter will automatically stop upon completion of one single cycle, and will not restart until another running command is given to start.
Keep final value upon completion of one-time running
The inverter will automatically keep the running frequency and direction of latest stage after completion of one single cycle.
cycling operation: The inverter will automatically start next one cycle upon completion of one cycle, and will not stop until stop command is given.

P11.17	PLC restart mode selection	0: restart from the 1st stage 1: start from the broken stage frequency	0	○

This parameter is used to set simple PLC restart after stopped, whether to choose to restart running or running from interrupted stage.

P11.18	Simple PLC memory	0: power off memory 1: no memory upon power off	0	○

This parameter is used to set memory selection when simple PLC stopped or power loss.

P11.19	MS speed time	0: s	0	◎

	unit setup	1: h		

This parameter is used to set the running time unit selection of simple PLC.

P11.20	The 0 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.21	The 0 stage time speed-up/down time selection	0~3	0	○
P11.22	The 1 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.23	The 1 stage time speed-up/down time selection	0~3	0	○
P11.24	The 2 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.25	The 2 stage time speed-up/down time selection	0~3	0	○
P11.26	The 3 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.27	The 3 stage time speed-up/down time selection	0~3	0	○
P11.28	The 4 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.29	The 4 stage time speed-up/down time selection	0~3	0	○
P11.30	The 5 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.31	The 5 stage time speed-up/down time selection	0~3	0	○
P11.32	The 6 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.33	The 6 stage time speed-up/down time selection	0~3	0	○
P11.34	The 7 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.35	The 7 stage time speed-up/down time selection	0~3	0	○
P11.36	The 8 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.37	The 8 stage time speed-up/down time selection	0~3	0	○
P11.38	The 9 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.39	The 9 stage time speed-up/down time selection	0~3	0	○
P11.40	The 10 stage time	0.0s(h)~6000.0s(h)	0.0s	○
P11.41	The 10 stage time speed-up/down time	0~3	0	○

	selection			
P11.42	The 11 stage time	0.0s(h)~6000.0s (h)	0.0 s	○
P11.43	The 11 stage time speed-up/down time selection	0~3	0	○
P11.44	The 12 stage time	0.0s(h)~6000.0s (h)	0.0 s	○
P11.45	The 12 stage time speed-up/down time selection	0~3	0	○
P11.46	The 13 stage time	0.0s(h)~6000.0s (h)	0.0 s	○
P11.47	The 13 stage time speed-up/down time selection	0~3	0	○
P11.48	The 14 stage time	0.0s(h)~6000.0s (h)	0.0 s	○
P11.49	The 14 stage time speed-up/down time selection	0~3	0	○
P11.50	The 15 stage time	0.0s(h)~6000.0s (h)	0.0 s	○
P11.51	The 15 stage time speed-up/down time selection	0~3	0	○

The above parameters are used to set the running time of each stage and the speed-up/down time of each stage in simple PLC operation, the running frequency of each stage and running direction is corresponding to each stage of MS speed.

If one stage running time is 0, then no matter how operating frequency is this stage will be jumped over,

if one stage running time is not 0 but running frequency is 0, the inverter will keep output as zero frequency within this stage.

6.12 P13 Protection Function Parameters Group

P13.00	Motor 1 overload protection selection	0: no protection 1: general motor (with low speed compensation) 2: various frequency motor (with no low speed compensation)	2	○
P13.01	Motor 1 overload protection factor	20.0%~200.0%	100.0%	○
P13.02	Motor 2 overload protection selection	0: no protection 1: general motor (with low speed compensation) 2: various frequency motor (with no low speed compensation)	2	○
P13.03	Motor 2 overload protection factor	20.0%~200.0%	100.0%	○

Enable motor overload software protection function, via checking the inverse time limit curve feature when inverter has motor overload protection, in order to judge if motor is in overload state.

Closing motor overload software protection function, may has the risk of overheat damage to motor, it is highly recommended to add a thermal relay between inverter and motor to protect motor when setting the parameter.

The inverse time limit curve of motor overload protection default as: 200% motor rate current, keep 1min then alarming motor overload error; 120% motor rate current, keep 60min then alarming motor overload error. Via adjusting motor overload protecting factor to smoothening motor overload curve, and to meet actual application.

The bigger the overload protection factor is, the longer the overload time is.

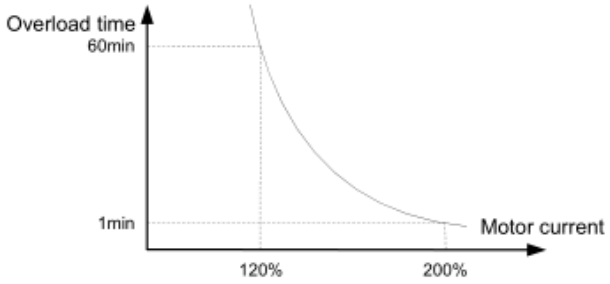


Fig 6.12-1 Motor overload curve

P13.04	Inverter or motor overload pre-alarming detecting level	50%~200%	G type motor: 150% P type motor: 120%	○
P13.05	Inverter or motor overload pre-alarming detecting time	0.0s~3600.0s	1.0s	○

Inverter or motor overload pre-alarming detecting level: before inverter or motor overload error protection, DO send a pre-alarm signal to control system. The pre-alarm factor is to decide what time to pre-alarm before inverter or motor overload protection. The bigger the value is, the smaller the pre-alarm advanced quantity is.

Inverter or motor overload pre-alarming detecting time: DO output overload pre-alarm signal, when overload pre-alarm occurred and bigger than overload pre-alarm detecting time. As below diagram:

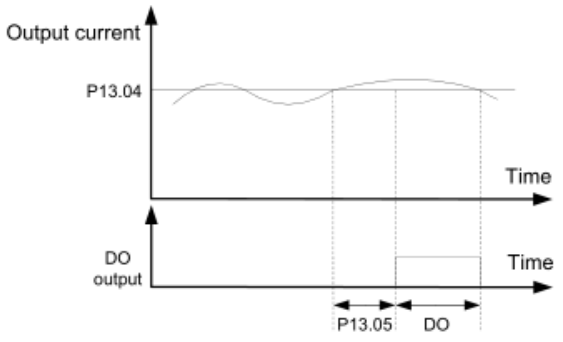


FIG 6.12-2 Detection of overload pre-alarm

P13.06	Inverter or motor offload pre-alarm detect level	0%~P13.04	50%	○
P13.07	Inverter or motor offload pre-alarm detect time	0.0s~3600.0s	1.0s	○

Inverter or motor offload pre-alarm detect level : before inverter or motor offload error protection,

DO send a pre-alarm signal to control system. The pre-alarm factor is to decide what time to pre-alarm before inverter or motor offload protection. The bigger the value is, the bigger the pre-alarm advanced quantity is.

Inverter or motor offload pre-alarm detect time: DO output offload pre-alarm signal, when offload pre-alarm occurred and bigger than offload pre-alarm detecting time. As below diagram:

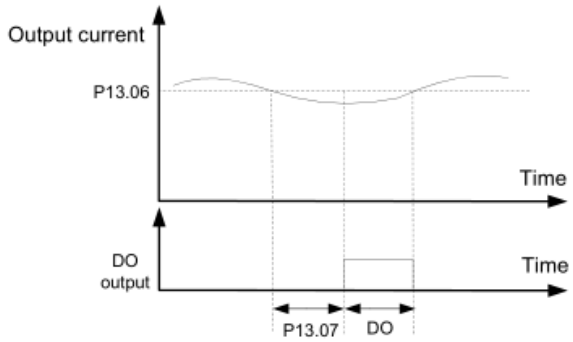


FIG 6.12-3 Offload pre-alarm detection

P13.08	Inverter or motor overload/offload pre-alarm selection	0x000~0x131 LED the unit bit: 0: motor overload/offload pre-alarm, relative to motor rate current 1: inverter overload/offload pre-alarm, relative to inverter rate current LED the decade bit: 0: continue running after inverter overload/offload alarming 1: inverter continue running after offload alarming, stop running after overload alarm. 2: inverter continue running after overload alarming, stop running after offload alarm. 3: inverter stop running after offload and overload alarm. LED the hundred bit: 0: keep detecting 1: detecting in constant speed running	0x000	O

The parameter is used to whether to selecting inverter pre-alarm function or motor pre-alarm function. Such as pre-alarm detecting method and the disposal method after pre-alarming.

P13.09	Output current over limit detecting value	0.0%: no detecting 0.1%~300.0%	0.0%	O
P13.10	Output current over limit detecting time	0.0s~100.0s	0.0s	O
P13.11	Output current over limit action	0: terminal output 1: terminal output and alarming Er016 2: terminal output, only alarming with constant speed Er016	0	O

		3: terminal output only with constant speed		

This group of function code is used to set detecting motor output current, output current over limit detecting delay time, DO action and inverter error alarming of detecting result etc. If choose error alarming then inverter stop running. As below diagram:

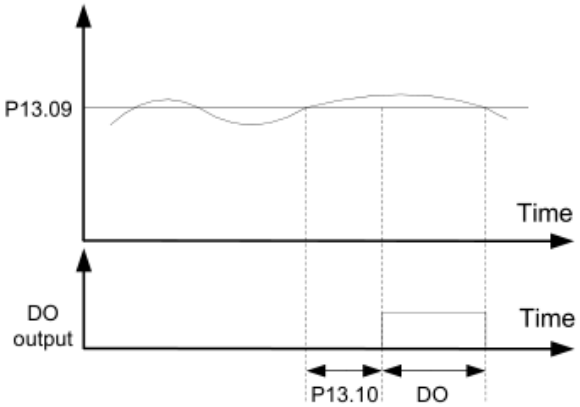


FIG 6.12-4 Diagram of output current over limit detecting

P13.12	Overvoltage underspeed protection	0: prohibit 1: permit		O
P13.13	Overvoltage underspeed protection voltage	120~150%(standard bus voltage 380) 120~150%(standard bus voltage 220)	140 % 120 %	O

Used to set the overvoltage threshold voltage of inverter DC bus and whether to open overvoltage underspeed protection. For big inertia but with no configured braking circuit, if prohibiting overvoltage underspeed protecting inverter will easily jump over overvoltage error, if open overvoltage underspeed protection then resulting in inverter actual decelerating time will be delayed. If inverter built-in brake unit and configured braking resistor. P13.13 is the brake unit threshold voltage when overvoltage.

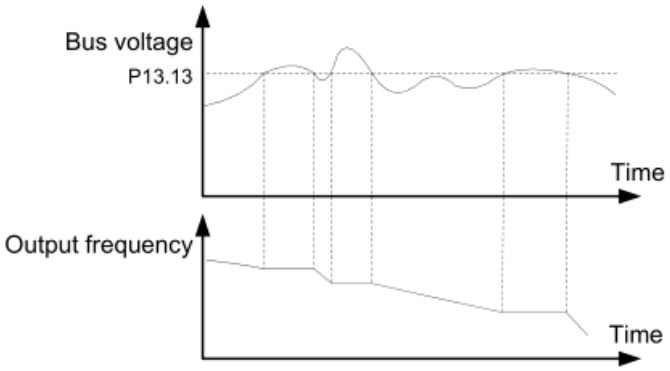


Fig 6.12-5 Diagram of over voltage underspeed

P13.14	Energy consumption brake enabling	0: prohibit 1: enabling	1	O
P13.15	Energy consumption brake voltage	200.0VDC~2000.0VDC	200VAC corresponding: 380.0VDC 380VAC corresponding: 700.0VDC	O

The above parameter is used to open inverter energy consumption braking voltage threshold,

when inverter configured brake unit.

P13.16	Current limit selection	0x00~0x11 LED the unit bit: current limit action selection 0: current limit action invalid 1: current limit action valid LED the decade bit: hardware current limit overload alarm selection 0: hardware current limit overload alarm valid 1: hardware current limit overload alarm invalid	0x01	O
P13.17	Auto current limit level	50.0%~200.0%	G motor: 160.0% P motor: 120.0%	O
P13.18	Frequency falling ratio when current limiting	0.00Hz/s~50.00Hz/s	10.00Hz/s	O

Overcurrent underspeed is similar to overvoltage underspeed, when inverter is in starting speed-up process, then inverter output frequency stop speed-up and keep current running frequency, waiting until output current lower than underspeed upper limit then starting speed-up. As Fig 6.12-6 showed.

If inverter with constant speed, load jump and result in inverter output current exceeding overcurrent underspeed upper limit, the output frequency of inverter will decrease as P13.18 set and keep decreasing until output current less than P13.17 setting threshold value. As Fig 6.12-6 with constant speed :

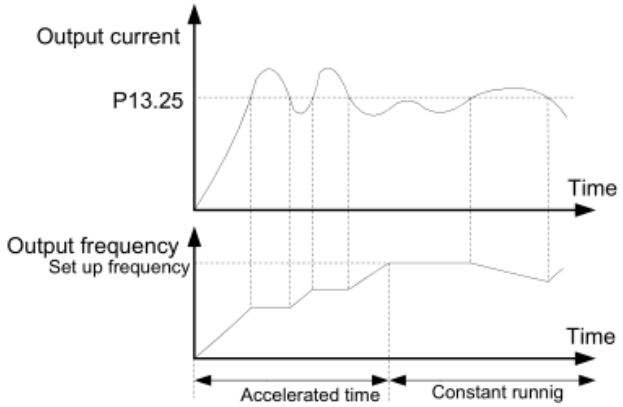


Fig 6.12-6 Diagram for over-current stall protection

P13.19	Phase loss protection	0x00~0x11 LED the unit bit: 0: input phase loss protection	0x11	O

		prohibit 1: input phase loss protection permit LED the decade unit: 0: output phase loss protection prohibit 1: output phase loss protection permit		

Select whether to provide protection for Input or output phase failure. Only the VD series inverter of G model with over 18.5kW can have input phase loss protection function,and the P model with 18.5kW has not such function no matter whether F9-10 is set to 0 or 1.

P13.20	Instant power loss frequency decreasing function selection	0: prohibit 1: permit	0	○
P13.21	Instant power loss speed-down time	0.0s~3600.0s	10.0S	○
P13.22	Instant power off judgment voltage	200.0VDC~600.0VDC	380VAC corresponding:420.0VDC 220VAC corresponding:240.0VDC	○

This function means that when instant power off or voltage suddenly drop, inverter output speed will decrease and load feedback energy will compensate to drop of inverter DC bus voltage, in order to maintain inverter keep running and avoid undervoltage error caused stopping.

P13.20 is used in selecting protection function in instant power off. When bus voltage is low or instant power loss and P13.20=1, then inverter output frequency will judge and interfere inverter output frequency according to P13.21 P13.22 set, until bus voltage recovering to normal.

P13.25	Power-on short circuit to ground protection selection	0: valid 1: invalid	0	

To check if motor is short circuit to ground when inverter powered on, if selecting detecting valid, inverter output terminal U V W has voltage output after powered on for a short period, it is used to check if motor is short circuited or not.

P13.26	Error output terminal action selection when error occurred	0x00~0x11 LED the unit bit: 0: action when under voltage error 1: no action when under voltage error LED the decade bit: 0: action within auto reset period 1: no action within auto reset period	0x00	○

Used to select fault output terminals in the under-voltage and automatic reset action

P13.27	Error auto reset times	0~20	0	○

When the inverter selects fault auto reset, it is used to set the times of auto reset. If fault times exceeded the this parameter value, the inverter will keep error status.

P13.28	Error auto reset interval time	0.1s~3600.0s	1.0s	○

The parameter is used to set the interval time from inverter error alarming to auto reset error. If inverter occurred error within the interval time then inverter will not reset and give alarming.

P13.29	Fan starting mode	0：Auto control 1： Fun running all the time	0	○

Used to select a cooling fan mode of action, choosing to 0, the running state of the inverter in the fan operation, stop state if the radiator temperature is above 40 degrees fan operation, stop condition radiator temperature below 40 degrees fan doesn't work. This mode can greatly improve the service life of the cooling fan.

Choose to 1, the fan has been running after the inverter to electricity.

6.13 P14 Error Record Parameter group

P14.00	Error record selection	0~3 (0: current error, 1: the latest error, the bigger the ID is, the earlier the fault is.)	0	○

This parameter is used to select the user needs to check when failure keep records. Note: the bigger

the ID number down sooner

P14.01	Error code	0~63, detail refer to below table	0	●

Error code	Error code description	Error code	Error code description
0	No error	Er001	Speed-up running overcurrent(hardware)
Er002	Speed-down running overcurrent(hardware)	Er003	Constant speed running overcurrent (hardware)
Er004	Speed-up running overcurrent(software)	Er005	Speed-down running overcurrent (software)
Er006	Constant speed running overcurrent (software)	Er007	Speed-up running overvoltage
Er008	Speed-down running overvoltage	Er009	Constant speed running overvoltage
Er010	Bus under voltage	Er011	Motor overload
Er012	Inverter overload	Er013	Input side phase loss
Er014	Output side phase loss	Er015	Module overheat
Er016	Current overlimit error	Er017	External error
Er018	Communication error	Er019	Current detecting circuit error
Er020	Motor self-learning error	Er021	EEPROM read-write error
Er022	PID feedback overlimit error	Er023	PID feedback breakline error
Er024	Motor to ground short circuit	Er025	Reserve

Er026	Reserve	Er027	Running time arrival
Er028	Power-on time arrival	Er029	Offload
Er030	Reserve	Er031	reserve
Er032	Reserve	Er033	Reserve
Er034	Motor overheat	Er035	Reserve
Er036	Electronic overload	Er037	User define error
Er041	User define error 1	Er042	User define error 2
Er043	User define error 3	Er044	User define error 4
Er060	manufacturer define error 1	Er061	manufacturer define error 2

This parameter is used to display the failure record when user check over the error record. If the displaying is 0 that is no error record.

P14.02	Running frequency at fault	0.00Hz~650.00Hz	0.00Hz	●
P14.03	current at fault	0.0A~2000.0A	0.0A	●
P14.04	Output voltage at fault	0V~2000V	0V	●
P14.05	Bus voltage at fault	0.0V~2000.0V	0.0V	●
P14.06	Input terminal status at fault	0X000~0X1FF	0x000	●
P14.07	Output terminal status at fault	0x00~0x1F	0x00	●
P14.08	Inverter temperature at fault	-20.0℃~120.0℃	0.0℃	●

P14.02~P14.08 parameters showed a detailed record of 10itmes of parameter content when the user checked present fault, so that users can analysis and dispose properly.

6.14 P15 Modbus Communication Parameter Group

P15.00	Communication agreement selection	0: Modbus	0	●

This parameter is used to select the inverter serial communication protocol type of communication.

P15.01	IP address	0: broadcasting address 1~247: slave address	1	○

When the host is writing data frame, the slave communication address set to 0, as the broadcast address, all the salves from Modbus will accept the frame but slaves without response.

The machine address has uniqueness in the communication network, which is to achieve the basis of point to point communication of HOST pc and inverter.

Note: when you need to read the inverter running data, the slave address cannot be set as 0.

P15.02	Baud rate	0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps 6: 57600bps 7: 115200bps	3	○

This parameter is used to set data transfer rate between the HOST PC and inverter. Note: the HOST pc and inverter set baud rate must be the same, otherwise, the communication can't be

done. The bigger the baud rate is, the faster the communication is. But it is easy to be interfered by external environment, please choose according to peripheral environment.

P15.03	Data format	0: no verify (N,8,1) for RTU 1: even verify (E,8,1) for RTU 2: odd verify (O, 8,1) for RTU 3: no verify (N,8,2) for RTU 4: even verify (E,8,2) for RTU 5: odd verify (O,8,2) for RTU	0	○

This parameter is used to set the communication format between HOST PC and inverter. HOST PC and inverter setting data format must be the same, otherwise, communication cannot be done.

P15.04	Response delay	0ms~200ms	5ms	○

Response delay time:

refers to the interval time from inverter data receipt ends to sending HOST PC response data. If response delay is less than system disposal time, then response delay take system disposal time as reference, if response delay is longer than system disposal time, then after system disposal of date, then waiting delay until response delay time arriving to send out data to HOST PC.

P15.05	Communication overtime detecting time	0.0s: no detecting 0.1s~100.0s	0.0s	○
P15.04	Response delay	0ms~200ms	5ms	○

When the function code is set to 0.0 s, communication timeout parameter is invalid. When the function code set to valid values, if a communication and the interval time of the next communication beyond the communication timeout, system will be submitted to the communication failures Er018.

Usually, it is set into is invalid. If in the continuous communication system, set this parameter, you can monitor the communication status.

P15.06	Communication overtime error disposal	0: alarm and random stop 1: no alarm but continue running 2: no alarm and stop according to stop mode(only in communication control mode) 3: no alarm and stop according to stop mode (in all control mode)	0	○

When set up the communication timeout detection, this parameter is used to set the

communication timeout after inverter action way.

P15.07	Communication disposal action selection	0x00~0x11 LED the unit bit: 0: write operation with response 1: write operation with no response LED the decade bit: 0: communication encryption set invalid 1: communication encryption set valid	0x00	○

The parameter is used to set whether inverter will response data in communication and whether communication encryption setup is valid.

Write operation with response: inverter responses data to host PC for read write command.

Write operation with no response: inverter only responses data to host PC read command, no response data to write command, helpful for improving communication efficiency.

Communication encryption setup invalid: communication is not limited by user password encryption.

Communication encryption setup valid: communication is limited by user password encryption.

6.15 P20 Motor 2 Parameter Group

Refer to the detail specification of P02 group motor 1 parameter

6.16 P21 Motor 2 V/F Control Parameter Group

Refer to the detail specification of P04 group motor 1 V/F control parameter group

6.17 P28 Status Monitoring Parameter Group

Code	Description	Real-time Display	Unit	Property
P28.00	Running frequency		0.01Hz	●
P28.01	Setting frequency		0.01Hz	●
P28.02	Slope given frequency		0.01Hz	●
P28.03	Bus voltage		0.1V	●
P28.04	Output voltage		1V	●
P28.05	Output current		0.1A	●
P28.06	Torque current		0.1A	●
P28.07	Excitation current		0.1A	●
P28.0	Output power percentage		0.1%	●

8				
P28.09	Output torque		0.1Nm	●
P28.10	Output torque percentage		0.1%	●
P28.11	Setting torque percentage		0.1%	●
P28.12	Motor running speed		1RPM	●
P28.13	Speed controller output		0.0%	●
P28.14	DI input status		1	●
P28.15	DO input status		1	●
P28.16	AI1 voltage		0.01V	●
P28.17	AI2 voltage		0.01V	●
P28.18	AI2 voltage(extention card)		0.01V	●
P28.19	Count value		1	●
P28.20	Motor power factor		0.01	●
P28.21	Magnetic flux linkage		0.1%	●
P28.22	PID set		0.01	●
P28.23	PID feedback		0.01	●
P28.24	PID output value		0.1%	●
P28.25	PLC stage		1	●
P28.26	HS pulse input frequency		0.01KHz	●
P28.27	Linear velocity		1	●
P28.28	Accumulate running time		1h	●
P28.29	Accumulate power-on time		1h	●
P28.30	Present running time		1min	●

P28.31	Present power on time		1min	●
P28.32	Module temperature		0.1℃	●
P28.33	Motor temperature		0.1℃	●
P28.34	Frequency fine tuning quantity		0.01Hz	●
P28.35	AC line-in current		0.1A	●
P28.36	Accumulate electricity consumption high bit		1KWH	●
P28.37	Accumulate electricity consumption low bit		0.1wh	●
P28.38	Load speed display		1	●
P28.39	Accumulate running time (for manufacturer use only)		1h	●
P28.40	Torque compensation quantity		0.0%	●
P28.41	PID feed forward gain after correction		0.000	●
P28.42	PID feed forward part		0.0%	●
P28.43	PID adjusting part		0.0%	●

The above parameters are used to check the inverter input, output, and other users to set the real-time display of function value. Users may have the group function code real-time view, judge the running state of transducer.

6.18 P29 User Parameter Group

P29.00	User password	0~65535	0	○

Any non-zero number can be set, and then the password protection function will be enabled.

000: Clear the previous setup user password and disable the password protection function.

Upon setup and validation of the user password, when the user enters the parameter setting status again, the user can view the parameters only and cannot modify the parameter if the password is incorrect. Please remember the setup user password correctly. If the password is set wrongly or forgotten, please contact the manufacturer

P29.01	Parameter initialization	0: no operation 1: recover manufacturer parameter 2: clear error record 3: clear accumulate running and power-on time	0	◎

recover manufacturer parameter: inverter function parameter mostly is recovered to manufacturer parameter, but motor parameter, error record message, accumulate running time, accumulate

power-on time are not recovered.

clear error record: clear inverter error record message

clear accumulate running and power-on time: used to clear accumulate running and power-on time of inverter record.

P29.02	Product code	0~65535	Manufacturer set	●
P29.03	Software version	1.00~10.00	Manufacturer set	●
P29.04	Inverter rate power	0.4kw~1000.0kw	Manufacturer set	●
P29.05	Inverter rate voltage	220V~1140V	Manufacturer set	●
P29.06	Inverter rate current	2.4A~2000.0A	Manufacturer set	●
P29.07	Manufacturer use			☆
P29.08	Manufacturer use			☆
P29.09	Manufacturer use			☆
P29.10	Manufacturer use			☆
P29.11	Manufacturer use			☆

Above parameter is used to check over inverter manufacturer setting and inverter critical parameter, only for user to review.

6.19 P30 Factory Parameter Group

Factory set parameters, users need to modify, forbidden user tries to enter the parameter set view or modify any of these data, it will cause an estimated unexpected and even serious fault..

Chapter 7 EMC Guide

7.1 Definition

Electromagnetic compatibility is the ability of the electric equipment to run in the electromagnetic interference environment and implement its function stably without interferences on the electromagnetic environment

7.2 EMC Standard Introduction

VD300 inverters have pass CE Test and is conformed to the requirements of the standard IEC/EN61800-3：2004.

IEC/EN61800-3 assesses the inverter in terms of electromagnetic interference and Anti electromagnetic interference. Electromagnetic interference mainly tests the radiation interference, conduction interference and harmonics interference on the inverter (required for the inverter for civil use)Anti-electromagnetic interference mainly tests the conduction immunity,
radiation immunity, surge interference immunity, rapid mutation pulse group immunity, ESD immunity.

7.3 EMC Guide

During inverter installation and usage, please comply to details of this chapter, in general industry environment it has good electromagnetic compatibility.

7.3.1 Harmonic Effect:

Higher harmonics of power supply may damage the inverter. Thus, at some places where power quality is rather poor, it is recommended to install AC input reactor.

7.3.2 Electromagnetic Interference and Installation Precautions

There are two kinds of electromagnetic interferences, one is interference of electromagnetic noise in the surrounding environment on the inverter, and the other is interference of inverter on the surrounding equipment.

Installation precautions:

1) The earth wires of the Inverter and other electric products shall be well grounded;

2) The power input and output power cables of the inverter and weak current signal cables (e.g. control line) shall not be arranged in parallel and vertical arrangement is preferable.

3) It is recommended that the output power cables of the inverter employ shield cables or steel pipe shielded cables and that the shielding layer be earthed reliably. The lead cables of the equipment suffering interferences are recommended to employ twisted-pair shielded control cables, and the shielding layer shall be earthed reliably.

4) When the length of motor cable is longer than 100 meters, it needs to install output filter or Reactor

7.3.3 Handling method for the interferences of the surrounding equipment on the inverter

The electromagnetic interference on the inverter is generated because plenty of relays, contactors and electromagnetic brakes are installed near the inverter. When the inverter has error action due to the interferences, the following measures can be taken:

1) Install surge suppressor on the devices generating interference;

2) Install filter at the input end of the inverter. Refer to Section 7.3.6 for the specific operations.

3) The lead cables of the control signal cable of the inverter and the detection line employ shielded

cable and the shielding layer shall be earthed reliably.

7.3.4 Handling method for the interferences of inverter on the surrounding equipment

These interferences include two types: one is radiation interference of the inverter, and the other is conduction interference of the inverter. These two types of interferences cause the surrounding electric equipment to suffer electromagnetic or electrostatic induction. The surrounding equipment hereby produces error action. For different interferences, it can be handled by referring to the following methods

1) For the measuring meters, receivers and sensors, their signals are generally weak. If they are placed nearby the inverter or together with the inverter in the same control cabinet, they are easy to suffer interference and thus generate error actions. It is recommended to handle with the following methods: Put in places far away from the interference source; do not arrange the signal cables with the power cables in parallel and never bind them together; both the signal cables and power cables employ shielded cables and are well earthed; install ferrite magnetic ring (with suppressing frequency of 30 to 1,000MHz) at the output side of the inverter and wind it 2 to 3 cycles; install EMC output filter in more severe conditions

2) When the equipment suffering interferences and the inverter use the same power supply, it may cause conduction interference. If the above methods cannot remove the interference, it shall install EMC filter between the inverter and the power supply (refer to Section for the prototyping operation);

3) The surrounding equipment is separately earthed, which can avoid the interference caused by the leakage current of the inverter's earth wire when common earth mode is adopted.

7.3.5 leakage current and disposal

Inverter leakage current has two types: one is to ground leakage current, one is line-to-line leakage current.

1) the factors of affecting ground leakage current and solution:

the conducting cable and earth has distribution capacitor, the bigger the capacitor is, the bigger the leakage current is, so by effectively shorten the distance between motor and inverter can reduce distribution capacitor. The bigger the carrier frequency is, the bigger the leakage current is. By reducing carrier frequency to reduce leakage current, but reducing carrier frequency will result in motor noise increasing. Please pay attention: add electric reactor is also a way to solve leakage current. The leakage current will increase as following the increase of loop circuit current. So if motor power is big, the corresponding leakage current is big.

2) the factors resulting in line-to-line leakage current and solution:

There is distribution capacitor among inverter output wirings, if the passing current has higher harmonic, it may result in resonance and bring leakage current. If using thermal relay might result in wrong action. The solution is t o reduce carrier frequency or add output electric reactor. In application, it is not recommended to add thermal relay between motor and inverter, but to use inverter electronic overcurrent protection function.

7.3.6 Notice for Power input side adding EMC input filter

⚠ **WARNING**
● When using the inverter, please follow its rated values strictly. Since the filter belongs to Classification I electric appliances, the metal enclosure of the filter shall be large and the metal ground of the installing cabinet shall be well earthed and

have good conduction continuity. Otherwise there may be danger of electric shock and the EMC effect may be greatly affected.

● Through the EMC test, it is found that the filter ground must be connected with the PE end of the inverter at the same public earth. Otherwise the EMC effect may be greatly affected.

● The filter shall be installed at a place close to the input end of the power supply as much as possible.

Chapter 8 Trouble Shooting and Solutions

8.1 Fault Alarm and Countermeasures

VD300 inverter has warning information and fault protection function. In case of abnormal fault, the inverter error relay contactor will be in action, before user seeking for help, please do self-inspection according to this chapter to analyze causes and find out solution. If user cannot solve problem by himself, seeking for help or directly contact your local dealer.

VD300 inverter during running process or powered on, if fault occurred, the display will show error code. At the moment inverter already have protection effectively to the fault, output terminal stopped output, the display panel has indicating current error with code.

Inverter keypad displayer has showing error code when in error, the code content and corrective action as below table.

Code	Error type	Possible error causes	Solution
Er001	Speed-up running over-current (hardware)	1: speed-up time too short 2: motor parameter not correct 3: grid voltage too low 4: inverter power too small 5: V/F curve inappropriate 6: inverse module short circuit protection	1: extend speed-up time 2: self-tuning of motor parameter 3: check grid input power 4: select inverter with big power class 5: adjust V/F curve setting, adjust manual torque boost 6: inverter module or drive circuit damage
Er002	Speed-down running over-current (hardware)	1: speed-down time too short 2: load inertia torque too big 3: inverter power too small 4: inverse module short circuit protection	1: extend speed-down time 2: add external energy consumption brake unit 3: choose inverter with bigger class power 4: inverse module or drive circuit damage
Er003	Constant speed running over-current (hardware)	1: load with jump or abnormal 2: grid voltage too low 3: inverter power too small 4: inverse module short circuit protection	1: check load or reduce load jumping 2: check grid input power 3: choose inverter with bigger class power 4: inverse module or drive circuit damage
Er004	Speed-up running over-current (software)	1: speed-up time too short 2: motor parameter not correct 3: grid voltage too low 4: inverter power too small 5: V/F curve inappropriate	1: extend speed-up time 2: self-tuning of motor parameter 3: check grid input power 4: select inverter with big power class 5: adjust V/F curve setting, adjust manual torque boost
Er005	Speed-down running	1: speed-down time too short	1: extend speed-down time 2: add external energy consumption

	over-current (software)	2: load inertia torque too big 3: inverter power too small	brake unit 3: choose inverter with bigger class power
Er006	Constant speed running over-current (software)	1: load with jump or abnormal 2: grid voltage too low 3: inverter power too small	1: check load or reduce load jumping 2: check grid input power 3: choose inverter with bigger class power
Er007	Speed-up running over-voltage	1: input voltage abnormal 2: restart motor in rotating after instant power off	1: check grid input power 2: avoid stop and restart
Er008	Speed-down running over-voltage	1: speed-down time too short 2: load inertia torque too big 3: input voltage abnormal	1: extend speed-down time 2: increase energy consumption brake unit 3: check grid input power
Er009	Constant speed running over-voltage	1: input voltage abnormal 2: input voltage with abnormal change 3: load inertia too big	1: check grid input power 2: install input electric reactor 3: add external energy consumption brake unit
Er010	Bus under-voltage	1: grid voltage two low 2: instant power off	1: check grid input power 2: RESET operation
Er011	Motor overload	1: grid voltage too low 2: motor rate current setting un-correct 3: motor stalled for load jump too big	1: check grid voltage 2: reset setting motor rate current 3: check load, adjust torque boost quantity
Er012	Inverter overload	1: speed-up two quick 2: restart motor in rotating 3: grid voltage too low 4: load too big	1: increase speed-up time 2: avoid stop and restart 3: check grid voltage 4: choose bigger power inverter
Er013	Phase loss at input side	Phase loss with input R S T	1: check grid input power 2: check installation wring
Er014	Phase loss at output side	1: U V W output phase loss 2: load 3phase seriously unbance	1: check output wiring 2: check motor and cable
Er015	Inverse module overheat	1: inverter instant over current 2: output 3phase with interphase or short circuit to ground 3: air channel stalled or fan damaged 4: environment temperature high 5: control board connection	1: refer to overcurrent solution 2: re-wiring 3: clear fan channel or change fan 4: reduce environment temperature 5: check and re-connect 6: seek for help 7: seek for help 8: seek for help

		or plugin loose 6: auxiliary power damage, drive voltage under-voltage 7: power module with bridge arm straight 8: control board abnormal	
Er016	Current overlimit error in running	Setting of Current overlimit value is small	Check P13.09~P13.11 setting
Er017	External error	DI external error input terminal act	Check external device input
Er018	Communication error	1: baud rate setting inappropriate 2: adopt serious communication error 3: communication break up for long time	1: set appropriate baud rate 2: press STOP/RST key to reset, seek help 3: check communication interface wiring
Er019	Current detecting circuit error	1: control board connector with bad connection 2: auxiliary power damage 3: Hall device damage 4: amplify circuit abnormal	1: check connector, re-wring 2: seek help 3: seek help 4: seek help
Er020	Motor self-learning error	1: motor and inverter capacity not match 2: motor rate parameter setting inappropriate 3: self-learning parameter and standard parameter deviation too big 4: self-learning overtime	1: change inverter model 2: set rate parameter according to motor nameplate 3: make motor empty load, re-identify 4: check motor wire connection, parameter setting
Er021	EEPROM write-read error	1: control the write-read error of parameter 2: EEPROM damage	1: press STOP/RST key reset, seek help 2: seek help
Er022	PID feedback overlimit error in running	Feedback exceeding setting upper limit	Check if feedback source device is abnormal
Er023	PID feedback breakline error	1: PID feedback breakline 2: PID feedback source lost	1: check PID feedback signal 2: check PID feedback source
Er024	Motor short circuit to ground	One phase short circuit to ground (U V W)	Check output 3phase to ground conductance, eliminate error
Er025	Reserve		
Er026	Reserve		
Er027	Running time arrival	Setting running time arrival	Use parameter initial function to clear record message
Er028	Power-on time arrival	Set up power-on time arrival	Use parameter initial function to clear record message

Er029	Offload	Inverter running current smaller than setting value	Confirm if load has broken away or parameter setting is appropriate for actual condition
Er030	reserve		
Er031	Reserve		
Er032	Reserve		
Er033	Reserve		
Er034	Motor overheat	1: temperature sensor connection losen 2: motor temperature high	1: check temperature sensor connection and eliminate error 2: reduce carrier or take other measurement to cool down motor
Er035	Reserve		
Er036	Electronic overload	Inverter take overload protection according to set value	1: check load 2: reset overload pre-alarm parameter
Er041	User self-define error 1	User self-define error 1 signal input terminal valid	1: check the signal source 2: eliminate signal action source
Er042	User self-define error 2	User self-define error 2 signal input terminal valid	1: check the signal source 2: eliminate signal action source
Er043	User self-define error 3	User self-define error 3 signal input terminal valid	1: check the signal source 2: eliminate signal action source
Er044	User self-define error 4	User self-define error 4 signal input terminal valid	1: check the signal source 2: eliminate signal action source
Er060	Manufacturer self-define Error 1	Manufacturer inside use error code	Seek for help
Er061	Manufacturer self-define Error 2	Manufacturer inside use error code	Seek for help

8.2Common Faults and Solutions

8.2.1No display after power on:

Inspect whether the voltage of power supply is the same as the inverter rated voltage or not with multi-meter. If the power supply has problem, inspect and solve it. Inspect whether the three-phase rectify bridge is in good condition or not. If the

rectification bridge is burst out, ask for support.

Check the CHARGE light on. If the light is off, the fault is mainly in the rectify bridge or the buffer resistor. If the light is on, the fault may be lies in the switching power supply. Please ask for support.

8.2.2Power supply air switch trips off when power on:

Inspect whether the input power supply is grounded or short circuit. Please solve the problem. Inspect whether the rectify bridge has been burnt or not. If it is damaged, ask for support.

8.2.3Motor doesn't move after inverter running:

Inspect if there is balanced three-phase output among U, V, W. If yes, then motor could be damaged, or mechanically locked. Please solve it. If the output is unbalanced or lost, the inverter

drive board or the output module may be damaged, ask for support..

8.2.4 Inverter displays normally when power on, but switch at the input side trips when running:

①Inspect whether the output side of inverter is short circuit. If yes, ask for support.

②Inspect whether ground fault exists. If yes, solve it.

③If trip happens occasionally and the distance between motor and inverter is too far, it is recommended to install output AC reactor.

④If inverter in normal protection, after eliminating error, press STOP/RESET key to reset error, then restart inverter.

⑤After eliminating error, inverter power supply shut down, wait until LED display light off, then restart inverter.

⑥If above steps cannot get inverter back to normal usage, then take note of the error code displayed, and inverter specification, product number, then contact the manufacturer.

Chapter 9 Communication Protocol

VD300 series of inverter provides RS485 communication interface, and adopts Modbus-RTU communication protocol. User can carry out centralized monitoring through PC/PLC to get operating requirements.

9.1 About Protocol

This serial communication protocol defines the transmission information and use format in the series communication and it includes master-polling (or broadcasting) format, master coding method and the content includes function code of action, transferring data and error checking. The response of slave is the same structure, and it includes action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving the information or cannot finish the action demanded by master, it will send one fault signal to master as a response

9.2 Application Methods

VD300 inverter will be connected into a “Single-master Multi-slave” PC/PLC control net with RS485 bus.

9.3 Bus structure

(1) Interface mode RS485 Hardware interface.

(2) Transmission mode There provide asynchronous series and half-duplex transmission mode. At the same time, just one can send the data and the other only receives the data between master and slave. In the series asynchronous communication, the data is sent out frame by frame in the form of message.

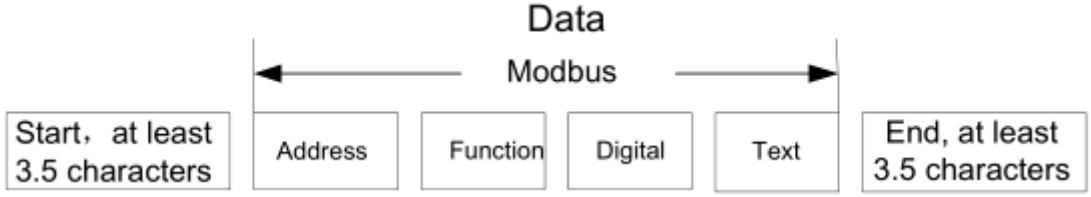
(3) Topological mode In Single-master system, the setup range of slave address is 0 to 247. Zero refers to broadcast communication address. The address of slave must is exclusive in the network. That is one condition of one slave machine.

9.4 Protocol description

VD300 series inverter communication protocol is a kind of serial master-slave communication protocol, in the network, only one equipment, and master can build a protocol, (Named as “Inquire/Command”). Other equipments, slave’s response “Inquire/Command” of master only by providing the data or doing the action according to the master’s “Inquiry/Command”. Here, master is Personnel Computer, Industrial Machine or Programmable logical controller, and the slave is inverter. Master not only visits some slave, but also sends the broadcast information to all the slaves. For the single master “Inquiry/Command”, all of slaves will return a signal that is a response; for the broadcast information provided by master, slave needs not feedback a response to master machine.

9.5 Communication Data Structure

ModBus protocol communication data format of MD320 series of inverter is shown as following: (In RTU mode, messages start with a interval of at least 3.5 character times. This is most easily implemented as a multiple of character times at the baud rate that is being used on the network. (shown as T1-T2-T3-T4 in the figure below). The first field then transmitted is the device address. The allowable characters transmitted for all fields are hexadecimal 0 ... 9, A ... F. Networked devices monitor the network bus continuously, including during the silent intervals.



When the first field (the address field) is received, each device decodes it to find out if it is the addressed device. Following the last transmitted character, a similar interval of at least 3.5 character times marks the end of the message. A new message can begin after this interval) The entire message frame must be transmitted as a continuous stream. If a silent interval of more than 1.5 character times occurs before completion of the frame, the receiving device flushes the incomplete message and assumes that the next byte will be the address field of a new message. Similarly, if a new message begins
earlier than 3.5-character times following a previous message, the receiving device will consider it a continuation of the previous message. This will set an error, as the value in the final CRC field will not be valid for the combined messages. A typical message frame is shown below.

Frame header START	T1-T2-T3-T4(3.5 bits transmission time)
Slave address field ADDR	Communication address: 0~247(decimal) (0 as broadcast address)
Function field CMD	03H: read slave parameter 06H: write slave parameter
Data field DATA(N-1)…DATA(0)	2*N bit data: this part is the main content of communication, also as the core of data exchange in communication
CRC CHK low bit	Detect value: CRC verify bit (16bit)
CRC CHK high bit	T1-T2-T3-T4(3.5 bits transmission time)
Frame footer END	
END Lo	

9.6 Command Code and Communication Data Description

9.6.1 Command code:： 03H （0000 0011） ， reads N words. (There are 16characters can be read at the most.)

For example: slave address is 01H inverter, memory start address is 3200H (output frequency address), read 5bits continuously (output frequency, setting frequency, motor running speed, bus voltage, output current 5 data of running parameter), the frame of structure as below:

RTU master command message

START	T1-T2-T3-T4
ADDR	01H
CMD	03H
Start address high bit	32H
Start address low bit	00H
Data bit high bit	00H
Data bit low bit	05H
CRC CHK low bit	8BH
CRC CHK high bit	71H
END	T1-T2-T3-T4

RTU Master command information

START	T1-T2-T3-T4
ADDR	01H
CMD	03H
Bit number	10H
Output frequency high bit	xxH
Output frequency low bit	xxH
Setting frequency high bit	xxH
Setting frequency low bit	xxH
Motor running speed high bit	XxH
Motor running speed low bit	XxH
Bus voltage high bit	xxH
Bus voltage low bit	xxH
Output frequency high bit	xxH
Output frequency low bit	xxH
CRC CHK low bit	xxH
CRC CHK high bit	xxH
END	T1-T2-T3-T4

9.6.2 command code: 06H (0000 0110), write one word

Such as: Write 5000(1388H) (write-in setting frequency 50.00Hz) write to slave address 01H inverter 3001H (communication setting frequency address). The frame structure description as below:

RTU Master command information.

START	T1-T2-T3-T4
ADDR	01H
CMD	06H
Write data address high bit	30H
Write data address low bit	01H
Data content high bit	13H
Data content low bit	88H
CRC CHK low bit	DAH
CRC CHK high bit	5CH
END	T1-T2-T3-T4

RTU slave response information.

START	T1-T2-T3-T4
ADDR	01H

CMD	06H
Write data address high bit	30H
Write data address low bit	01H
Data content high bit	13H
Data content low bit	88H
CRC CHK low bit	DAH
CRC CHK high bit	5CH
END	T1-T2-T3-T4

9.6.3 Communication format error check method

Format error check mode includes two part verification, bit check of byte (odd/even verify) and CRC check of complete data of format.

9.6.3.1 bit check of byte

User can select different check mode according to requirement, can also select no-check, but it will affect the bit setting of every byte check.

Even parity check: add a bit of even parity check before data transmission, to express the number of “1” in the transmission data is odd or even, if the number is even, check bit is “0”, otherwise it “1”. This is to keep the odevity remains unchanged.

Odd parity check: add a bit of odd parity check before data transmission, to express the number of “1” in the transmission data is odd or even, if the number is odd, check bit is “0”, otherwise it “1”. This is to keep the odevity remains unchanged.

For example, the transmitting data “11001110”, there is 5 “1” in the data, if using even parity check, the even check bit is “1”, if using odd parity check, the odd check bit is “0”, when transmitting, the odevity check bit will be processed and put at the position of format check bit. And the receiving device will also do odevity check, if it found the odevity of the received data is not the same as pre-set, then it decides that communication was in error.

9.6.3.2 CRC check method

In RTU frame format, format include format error-checking field that is based on CRC method calculation. The CRC field

checks the contents of the entire format. The CRC field has two bytes , containing a 16-bit binary value.

The CRC value is calculated by the transmitting device, which adds the CRC to the format.

The receiving device recalculates the received CRC format, and compares the value of CRC field received, if the two value of CRC is not equal, then there is error in transmission.

The CRC saves 0xFFFF at first, then call a process to deal with the successive 6 bytes of

the format and the value of present register. Only the 8bit data of each byte is valid for CRC, the starting bit and the end bit and odevity check bit is all invalid.

During generation of the CRC, each eight-bit character is separately do XOR with the register contents, the results is shitting towards the lowest valid bit, the highest valid bit is filled with 0. LSB is extracted to be checked, if LSB is 1, the register will be separately do XOR with pre-set value; if LSB is 0, then no need. The complete process will be repeated for 8times. After completing of the last bit (the 8^{th} bit), the next 8bit byte will be separately XOR with present register value. The final value of register is the CRC value of the all bit executed of the frame.

The calculation of CRC, adopting the international standard CRC check regulation, when user is editing CRC calculation, can refer to related CRC calculation.

Here providing a CRC calculation simple function for user reference.

```
unsigned int crc_cal_value(unsigned char *data_value，unsigned char data_length)
{
int i；
unsigned int crc_value=0xffff； while(data_length--)
{
crc_value^=*data_value++；
for(i=0；i<8；i++)
{
if(crc_value&0x0001)
     crc_value=(crc_value>>1)^0xa001；
else
    crc_value=crc_value>>1；
}
}
return(crc_value)；
}
```

In logic ladder, CKSM calculates CRC value according to frame content, adopting table look-up method, this method is simple in program, quick calculating speed, but with big occupying ROM space. Please consider carefully in application with requirement on program space.

9.6.4 Communication data address definition

The part is address definition of communication data, used to control inverter operating, acquiring inverter status message and inverter related function parameter setup etc.

1) function code parameter address expression rule

take sequence number of function code as parameter corresponding to register address, but need to be transferred into hexadecimal. Such as P05.11, the hexadecimal communication address is 050BH, P13.22 hexadecimal communication address is 0D16H.

Note: P30 group is manufacturer setting parameter, it cannot be read or changed. Some parameter cannot be changed when inverter is in operation, but some parameter cannot be changed no matter if inverter is running or not. When changing function code parameter, pay attention to the parameter setting range, unit and related illustration.

Furthermore, since EEPROM is saved frequently, thus will it reducing lifetime. For user, some function code under communication mode is not needed to be saved, only by changing the value of RAM can meet application requirement. In order to realize the function, getting the corresponding upper address of function code add with 80H(64 expressed in hexadecimal). For example, write function code P11.02 is needed to be saved to EEPROM, then set the address as 0B02H, then only change the RAM value and no need to be saved to EEPROM, by setting the address as 8B02H which only used in writing RAM not used in read function, reading this address is invalid.

2) other function address description:

Function	address definition	Data description			R/W property
Communication control order	30000H	001H:Forward rotation			R/W
		0002H:Reverse rotation			
		0003H:Stop			
		0004H:Free stop			
		0005H:Fault reset			
		0006H:Forward jog			
		0007H:Reverse jog			
		0008H:Jogging stop			
Communication setting value address	3001H	Communication setting frequency（0~ P00.07Unit 0.01Hz）			R/W
	3002H	Torque setting value（-3000~3000，1000 corresponding to 100.0% motor rated current			
	3003H	The upper limit torque of motor torque （0~3000，1000 corresponding to 100.0% inverter motor current）			
	3004H	brake torque upper limit torque (0~3000，1000 corresponding to 100.0% motor rated current)			
	3005H	The upper limit frequency setting of forward rotation （0~P00.07 Unit:0.01 HZ）			
	3006H	The upper limit frequency setting of reverse rotation （0~P00.07 unit:0.01Hz）			
	3007H	PID Setting, range（0~1000，1000 corresponding100.0%）			
	3008H	PID feedback, range（0~1000，1000 corresponding100.0%）			
	3009H	special control command byte:			
		Bit	0	1	
		bit0 (when bit1=0)	motor 1	motor 2	
		bit2	no action	torque control prohibit	
		bit3	no action	pre-excitation	
		bit4	no action	DC brake	

	300AH	voltage setting value (V/F separating use) (0~1000, 1000 corresponding 100.0% motor rate voltage)			
	300BH	virtual input terminal command, range: 0x000~0x1FF			
	300CH	virtual output terminal command, range: 0x00~0x1F			
	300DH	AO output set value 1 (-1000~1000, 1000 corresponding 100.0%)			
	300EH	AO output set value 2 (-1000~1000, 1000 corresponding 100.0%)			
	300FH	PID feedforward value（-1000~1000，1000 corresponding 100.0%）			
Inverter status byte 1	3100H	0001H：Forward rotation			R
		0002H：Reverse rotation			
		0003H： inverter Stopping			
		0004H：inverter at fault			
		0005H：inverter at POFF state			
		0006H：inverter at Pre-excitation state			
Inverter status byte 2	3101H	special control command byte:			W
		Bit	0	1	
		bit0 (when bit1=0)	motor 1	motor 2	
		bit2	ready for running	ready for running	
		bit3	motor with no excitation	motor in excitation	
		bit4	un-overload pre-alarm	overload pre-alarm	
error code	3102H	refer to eror type description			R
product code	3103H				R
output frequency	3200H	0.00Hz~P00.07			R
Setting frequency	3201H	0.00Hz~P00.07			R
motor running speed	3202H	0RPM~65535RPM			R
BUS voltage	3203H	0.0V~2000.0V			R
output current	3204H	0.0A~2000.0A			R
output voltage	3205H	0V~1200V			R
setting torque	3206H	-250.0%~250.0%			R
output torque	3207H	-250.0%~250.0%			R
output power	3208H	-300.0%~300.0%			R
input terminal state	3209H	0X000~0X003F			R
Output terminal state	320AH	0X000~0X000F			R
PID setting value	320BH	-100.0%~100.0%			R
PID feedback value	320CH	-100.0%~100.0%			R
AI1 input value	320DH	0.0V~10.0V			R
AI2 input value	320EH	0.0V~10.0V			R
AI3 input value	320FH	0.0V~10.0V			R
HS pulse input frequency	3210H	0.00kHz~100.00kHz			R
counting value	3211H	0~65535			R
MS speed present stage	3212H	0~15			R
password verify	4000H	0~65535			W

9.6.5 Inverter response when communication in error

In communication control, if communication operation command is in discrepancy (such as “read-only address to deal with write operation command), or communication operating address is in discrepancy (such as “ the address is not existed or the address doesn’t permit user operating); or operand is in discrepancy(such as “operand exceeding the setting range or operation communication continuously reading, inverter continuous address quantity less than communication read of address number). At this stage, inverter will return a error message to HOST pc on real-time for reminding communication error.

When inverter response to HOST pc, it use function code and error code to indicate if communication operation is normal or abnormal. For normal response, inverter returns back a

corresponding function code and data address or sub-function code; for communication operation abnormal response, inverter returned normal operation code with the highest bit setting as “1”, such as read command 03H, abnormal response as 83H; and write command 06H with its abnormal response as 86H. It follows the error message code and CRC check code.

Communication error code is the response from inverter sent to HOST pc, its code and meaning as below table:

Code	Description	Meaning
01H	illegal command	Command sent is illegal
02H	illegal data address	The register address sent to inverter is illegal or un-defined
03H	illegal data value	Inverter received data value exceeding permitted range
04H	Operation failure	Setting parameter in write operation is invalid setting
05H	Password error	User password checking is not pass
06H	Data frame error	The frame message sent from HOST pc, the length of data frame is not correct, or RTU format CRC checking error.
07H	Parameter read only	Write operation for read-only parameter
08H	Parameter running and cannot be changed	HOST pc change the parameters which cannot be changed when inverter is running.
09H	Password protection	HOST pc is reading or writing without password unlock.

When communication controls inverter, if communication operation is normal, the data returned from inverter in sequence order as inverter communication address, operation command byte, parameter address, parameter data and CRC checking. Such as the 3000H of number 01 inverter address, write in data is 1; then communication command is: 010630000001470A, and inverter returned data as：010630000001470A。If change the write in data to 09H, then communication command is:

01063000000946CC, and inverter returned data as: 01860443A3. And the returned data 86H stands for wrong write-in command, 04H is communication error code stands for operation failure, because for 3000H address, the max write-in number is 08H, exceeding its setting range.

9.6.6 continuous communication data address parameter read description

VD300 series inverter supports max 16 numbers continuous address parameter data reading, communication reading only need randomly designating starting address and the data byte numbers from starting address. Such as reading motor running frequency when inverter is running, reading motor running speed, output current, then communication parameter starting address is 3200H, reading data byte number is 0005H, inverter returned running data numbered 1, 3, 5 in sequence as motor running frequency, motor running speed, output current.

Communication address	Corresponding parameter serial number	Parameter Range	R/W property
Motor running frequency	3200H	0.00Hz~P00.07	R
Setting frequency	3201H	0.00Hz~P00.07	R
Motor running speed	3202H	0RPM~65535RPM	R
Bus voltage	3203H	0.0V~2000.0V	R
Output current	3204H	0.0A~2000.0A	R
Output voltage	3205H	0V~1200V	R
Setting torque	3206H	-250.0%~250.0%	R
Output torque	3207H	-250.0%~250.0%	R
Output power	3208H	-300.0%~300.0%	R
Input terminal state	3209H	0X0000~0X003F	R
Output terminal state	320AH	0X0000~0X000F	R
PID setting value	320BH	-100.0%~100.0%	R
PID feedback value	320CH	-100.0%~100.0%	R
AI1 input value	320DH	0.00V~10.00V	R
AI2 input value	320EH	0.00V~10.00V	R
HS pulse input frequency	320FH	0.00kHz~100.0kHz	R
Counting value	3210H	0~65535	R
MS speed present stage	3211H	0~15	R

Appendix A Multi-function I/O Extension Card

VD300 series inverter, supporting multi-function I/O extension card. Multi-function I/O extension card with 3 DI input terminal, 1 DO output terminal, 1 AI input terminal. Multi-function extension card and installation diagram as below.

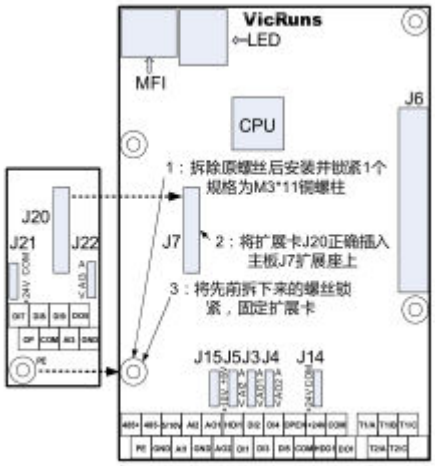


Fig A-1 Multi-function I/O extension card installation diagram

A.1 Multi-function I/O extension card installation notice:

Multi-function I/O extension card is to be installed to VD300 main control board, pay attention to J20 of extension card and J7 of main control board and must be strictly plugged in, cannot be misplaced or loosely plugged which might result in bad contactor.

A.2 Combination hub function description:

Table A-1 Combination function description

Combination mark	Function	Function Description
J20	Multi-function I/O extension card—control board	The combination hub is multi-function I/O extension card and the connection port of main control board. Main control board provide power supply to multi-function I/O extension card and also as the signal connection electric channel of main control board and multi-function I/O extension card.

A.3 Jumper wire switch function description

Table A-2 Combination hub function description

Jumper wire serial no	Jumper selection	Function Description
J21	24V terminal	When jumper cap is plugged in this terminal, OP terminal select +24V connection, DI7 DI8 DI9 are short circuited with COM and input valid
	COM terminal	When jumper cap is plugged in this terminal, OP terminal select COM terminal connection, DI7 DI8 DI9 are short circuited with +24V and input valid
J22	A terminal	When jumper cap is plugged in this terminal, AI3 terminal select DC0/4mA~20mA current signal input

	V terminal	When jumper cap is plugged in this terminal, AI3 terminal select DC0V~10V voltage signal input